Textile World Journal

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TARIFF AND PROSPERITY IN WOOLEN INDUSTRY

MILL ACTIVITY NOT SIGN OF FAIR PROTECTION

Cincinnati "Enquirer" Answered on Question of Tariff by George C. Hetzel, of American Ass'n

The Cincinnati *Enquirer* recently printed an editorial inspired by the address of President Francis at the American Association of Woolen and Worsted Manufacturers. This editorial, entitled "Let Us Be Frank, Gentlemen," has been answered in such a complete and satisfactory manner by George C. Hetzel, vice-president of the American Association, that the editorial and the letter in reply are printed herewith. The editorial follows:

"There is due the American people, who as the consumers pay the duties levied under all tariff laws, either high or low, frankness on the part of those who seek protection against foreign competition. In his address to the members of the American Association of Woolen and Worsted Manufacturers, President Robert T. Francis asserted that the present schedules do not give adequate protection to the woolen industry. The present prosperity he attributed entirely to demands growing out of war conditions, and he added that the future did not seem bright unless a substantial increase was secured.

"On the same day, and in the same city, New York, the official publication of the woolen trade showed that the producing mills reported their stocks to be at a low level, some stating that their capacity was sold ahead through April. Jobbers are preparing for a shortage, and are seeking the covering of anticipated future needs. The Underwood Tariff Bill gave the manufacturers the advantage of free raw wool, which has helped to modify the cost of production, although that staple is commanding the highest price since the Civil War.

"Reports from abroad reveal that British manufacturers of war material have been warned to complete their present contracts and to prepare themselves for larger business. These conditions do not tally with the statement made by President Francis. In his recommendation for revision, former President Wm. H. Taft asserted that the woolen schedules were indefensible from his own standpoint as a protectionist. Yet there is seen a demand for the restoration of the old schedules. If the American Association is seeking a monopoly of the cloth used by the hundred million of American consumers it should be fair enough to state that desire without concealment, and not utter the foolish statements which the market reports confound and demolish. Nothing is to be gained by such a policy. It will be also wise to remember that the organization is not popular with the farmer who produces the wool, nor with the man who is compelled to pay two prices for his clothing. Fair play is a jewel."

Mr. Hetzel, in his reply to the editor of the *Enquirer*, says:

"The editorial in the issue of Dec. 13, entitled 'Let Us Be Frank, Gentlemen,' is the squalling child of unsophistication. Not ignorance in a general

(*Continued on page 26*)

NASHUA-JACKSON MERGER

Formal Transfer Took Place This Week

The long-delayed merger of The Jackson Company and the Nashua Manufacturing Co., Nashua, N. H., has at last been made possible by the final dismissal of all hindering litigation, and deeds transferring the real estate of the Jackson company to the Nashua company were filed in New Hampshire last Tuesday. Under date of Jan. 4, the officers of both companies mailed formal notification of the transfer to the creditors and obligees of The Jackson Co., which is as follows:

"You are hereby notified that in accordance with votes heretofore passed by the stockholders and directors of The Jackson Co. and the Nashua Manufacturing Co., all the transferable franchises, assets and property of every description of The Jackson Co. as a going concern were sold, transferred and delivered yesterday to the Nashua Manufacturing Co., the latter corporation paying therefor by increasing its capital stock from the sum of one million dollars ($1,000,000) to one million four hundred and fifty thousand dollars ($1,450,000) par value, by issuing said new capital stock to The Jackson Co. for distribution among the latter's stockholders, and by assuming all the debts and liabilities of The Jackson Co. of every nature and description. By the terms of the votes under which this sale was made, The Jackson Co. is to be dissolved as soon as the necessary arrangements can be completed, and the business heretofore carried on by The Jackson Co. will henceforth be conducted by the Nashua Manufacturing Co. By the terms of the indenture of sale and under the authority of the above-mentioned votes, the Nashua Manufacturing Co. has assumed all contracts, notes, accounts, debts and other liabilities of The Jackson Co. of every description outstanding Jan. 3, 1916, whether now due or hereafter to become due; and has covenanted with The Jackson Co. and the latter's creditors and obligees that it will perform all said contracts and discharge all said liabilities as performance or payment thereof becomes due."

Program for Knit Goods Buyers

Features of the program for the meeting of the Jobbers Association of Knit Goods Buyers next Monday, Jan. 10, at the Waldorf, are as follows: President's address by Benjamin Gibbs, of Young, Smyth, Field Co.; address on advance orders by W. S. Blau, of the Friedman-Blau-Farber Co.; address by P. C. Withers, president of the National Association of Hosiery and Underwear Manufacturers; address by Geo. H. Tyler, of the Shiebley-Tyler Co.; address on the 65c. price on underwear, by Arthur M. Reis, of Robt. Reis & Co.; general discussions on the following subjects: Problems in connection with the use of special colored boxes, co-operation of knit goods department in minimizing returned goods, how can we best encourage our salesmen to sell profitable merchandise, menace to the jobber incident to the practice of shipping goods to the jobbers' customers direct from manufacturers and cash discount on underwear. In the evening there will be a vaudeville-smoker.

DYESTUFF HEARING JAN. 14

Question of Rates Proposed in Hill Bill to Be Discussed

WASHINGTON, Jan. 6 (*Special*).—Representative Hill, of Connecticut, announced to-day, following a conference with Representative Kitchin, Chairman of the Ways and Means Committee, concerning the hearing on Mr. Hill's Bill H. R. 702, dealing with the manufacture of dyestuffs, that Friday, Jan. 14, has been decided upon as the date for the first hearing. Just how long these hearings will last cannot be foretold at this time, but Mr. Hill told your correspondent to-day that Mr. Kitchin had informed him he was very much interested in the whole dyestuff situation and is disposed to give as much time to this matter as necessary.

Mr. Hill to-day communicated with many of the most prominent textile manufacturers in the country, querying them as to whether or not they would be present and testify before the Committee if called upon. Mr. Hill also wrote to the American Chemical Society of New York and to many other allied associations, asking that they send representatives to be present at the forthcoming hearing. It will probably be some days before definite answers will be received. In connection with this proposed hearing it is well known that Mr. Hill's bill provides for the "establishment and maintenance of the manufacture of dyestuff." The bill, in full, was published in a recent issue of the TEXTILE WORLD JOURNAL.

NEW DEVELOPMENTS IN SITUATION

It is interesting to note, in view of the general dyestuff situation in this country that our imports of indigo, according to advance figures of the Department of Commerce, have fallen off very little despite the European war. These figures show that in the year 1915 there was only a very small shortage in the quantity imported as compared with that of 1914.

Government officials here have received a rather interesting report on the chemical situation in Japan. The report, in taking up the dyestuff industry, has the following to say: "The imports of aniline for 1913 amounted to $2,100,000, that of alizarine, $140,000 and that of artificial indigo, $1,515,000. Owing to the war the imports of these dyestuffs have entirely stopped since the end of last year, and, in consequence, prices have advanced several fold. In view of this situation the Government has recently announced that it has launched a plan to get capitalists to organize a dyestuff company with a capital of $3,000,000. Shareholders of this company are to be assured a dividend of 8 per cent. by the Government."

It is understood that a number of woolen manufacturers, because of the logwood embargo have installed chipping machines and extractors in their plants, so that they can utilize wood in the stick or chips, which are available at a price, which is not always the case with logwood extract.

Grinnell Willis & Co. Gets Verdict

Verdict was rendered in favor of Grinnell Willis & Co., in Part V, City Court, in their action to recover damages from the Imperial Underwear Co. of Scranton, Pa., due on a contract for merchandise of August, 1914.

DEFINITIONS OF FLANNEL HEARD IN CUSTOMS CASE

EXPERTS TESTIFY IN PROTEST CASE AGAINST DUTY

President Francis, of American Association, Gives Explicit Definition of Trade Usage

An interesting case was heard on Thursday at the Appraisers Stores that is of no little importance to domestic manufacturers. The question involved is one of the correct classification of a large number of distinct fabrics which the examiner has designated for entry under the duty of 35 per cent., while the importers claim that they should be entered as flannels at a lower rate of duty. Should the protest be sustained it would establish an exceedingly dangerous precedent, allowing a wide variety of suitings, vestings, outing cloths, cricket cloths and the like to enter the market at a lower rate of duty than even the present purely revenue bill contemplated. No witnesses for the protestants were heard at this time, the entire session being devoted to the examination of witnesses in support of the contention that the fabrics in question are not flannels, but are properly entered at the 35 per cent. accorded worsted and woolen cloths. While it is an utter impossibility to state with accuracy what the intent of the law is in certain cases in which broad classifications are made, there is not the slightest reason to believe that the framers of the present schedule intended to change designations or classifications so as to permit the entry of a great variety of cloths at the rate of duty prescribed for flannels.

Unfortunately, tariff bills in practically every instance are drawn up by men who, to say the least, have but a general idea as to trade names, designations and the technical details of cloth production. The result is that, because of lack of definition as to the exact intent, there is abundant opportunity afforded for difficult interpretation of the various schedules. This is particularly true of the textile schedules, both cotton and woolen. It is especially desirable that there should be an exactness of phraseology in the tariff law that would effectually preclude the possibility of any misinterpretation of the intent of the makers. In the absence of this accuracy, it becomes necessary to arrive at some definite differentiation of the various fabrics, frequently at a considerable loss of time and great expense.

The contention of the customs authorities that the fabrics were not flannels, but should be entered under the 35 per cent. rate, was supported by several well-known manufacturers and selling agents whose broad experience in the production and distribution of textiles qualifies them to offer expert testimony as to the correct classification and designation of textile fabrics.

WHAT IS A FLANNEL?

The first witness to testify in support of the examiner's claim that the fabrics are not flannels and therefore properly liable to the higher rate of duty, was Robert T. Francis of the Pontoosuc Woolen Mfg. Co. In reply to the question, "What is a flannel?" Mr. Francis gave a most clear and comprehensive definition of the term as used and com-

(*Continued on page 45*)

Textile World Journal
Textile World Record—Textile Manufacturers Journal

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For Publishers Announcement See Page 9

Entered in the New York, N. Y. Post Office as Second Class Matter

A TENET OF OUR CREED: WE BELIEVE IN THE CONSERVATION OF AND PROTECTION TO DOMESTIC INDUSTRIES

VOL. LI. January 8, 1916. No. 6

TARIFF AND IGNORANCE

The combination of ignorance and misstatement in the editorial of the Cincinnati *Enquirer*, printed elsewhere, is so colossal and self-evident to any one connected with the manufacture or sale of woolen goods that mention of it were unwarranted were it not to draw attention to the most admirable rejoinder of a well-known manufacturer which accompanies it. The pity is that it is necessary to correct such editorial statements which are printed for the consumption of the overworked "ultimate consumer" who seldom gets the other side because, forsooth, it does not make such sensational reading. It is too bad that more daily papers cannot see the possibility of injecting as much "human interest" into newspaper stories or editorials dealing with actual conditions as into those based on misstatements or garbled information.

There is no anomaly in the statement of President Francis that the present tariff is not sufficient to protect adequately the woolen manufacture, and the further one that the woolen industry is prosperous. There is no doubt that the war has acted as a tariff wall, more effective than any legislation which has ever been put on the statute books, while the converse is equally true that if it had not been for the war the woolen industry would have been suffering from a competition more disastrous than at any period during recent years. Preparations were being made by English and German manufacturers, who had had one season's experience under the low tariff, and who anticipated a land office business with this country when the war upset all these calculations. These preparations had proceeded to a point where the filling of orders was a very appreciable element in the imports after the war started. The volume of these imports was of such size as to warrant the conclusion that had normal conditions continued the American manufacturer would have had to reckon with a flood of imported goods which would have prevented the operation of American machinery or the employment of American labor except at the European wage level.

Elimination of imports and the placing of war contracts have produced a condition among woolen manufacturers which is admittedly prosperous, but it was both timely and wise for President Francis to utter a "warning for industrial preparedness," as Mr. Hetzel in his reply characterizes it. Although there are those who argue that we need not fear competition from abroad after the war is over, the very fact that British manufacturers, as stated in the *Enquirer's* editorial, are warned to prepare themselves for larger business is proof positive that their plants will be in readiness to cater for overseas trade and this market will be the one to which they will naturally turn. With the exception of Belgium and part of France the European manufacturing industry remains intact as far as plants are concerned. Although operating forces have been curtailed mills can be run with even a larger proportion of female help than at present if necessary. Mr. Hetzel well asks, "What will happen when the millions of men now fighting again return to peaceful pursuits?" The effect on foreign wages by the return of this vast horde of men seeking work is also a matter for more than speculation.

The influence of a protective tariff upon the consumer has seldom been better expressed than by Mr. Hetzel in the following language: "Under a thoroughly protective tariff, the consumer pays for protected, American-made commodities as much more than he would have to pay for identical foreign commodities, as the labor cost of everything that comprises the cost of home-made products exceeds the labor cost of foreign products. That higher price is the unfelt contribution all purchasers in America mutually make for the maintenance of the American standard of wages and living." The cost of clothing was not reduced to the consumer before the war by the increased flood of merchandise that came in here, notwithstanding the reduction in the selling prices of piece goods. At the same time the decrease in employment and in wages would have more than offset any reduction that could have transpired, had the clothing manufacturer and the retailer been willing to scale down their profit margins to a point commensurate with those of the piece goods producer.

Mr. Taft's much quoted Winona speech, which we imagine he has regretted more times than a little, is brought forward by so many newspaper writers on the tariff, that it would have been surprising had the *Enquirer* failed to incorporate his "indefensible Schedule K" in this attack upon woolen manufacturers in general, and the American Association in particular. Mr. Hetzel's characterization of Mr. Taft's friends upon whom he relied for information regarding the wool manufacturing business as "those whose knowledge was in inverse ratio to their vindictiveness toward the worsted manufacturers" is a delicious morsel, especially as it is so absolutely in accordance with historical facts. Of course, only dense ignorance causes the statement by the *Enquirer* that "the American Association is seeking a monopoly of the cloth used by the hundred million of American consumers." Cincinnati is not the center for trade associations. No such break would have been made by a New York daily, even of the most pronounced free trade proclivities.

POTASH AVAILABLE

In view of the present scarcity and high price of potash it would seem worth while for wool manufacturers in a few of the largest manufacturing centers, such as Lawrence, Providence and Philadelphia, carefully to consider the possible profit to accrue from recovering the potash salts in wool scouring liquids. From each 100 pounds of grease wool of average shrinkage there may be recovered approximately five pounds of potash salts. Carbonate of potash, which is the largest constituent of these salts, used to sell at 3c. a pound, and is now quoted at 42 to 48c.; and the demand is far in excess of the supply at that. The other potash salts found in wool suint have advanced proportionately.

While the desuinting of wool, and the calcining of the recovered suint, have been commonly practised in England and in French, Belgian and German wool manufacturing centers, only a few manufacturers in this country have recovered potash salts, or even degras; the relatively high price of labor, the cost of recovering plants and the low price of the recovered materials are factors that have rendered the venture unattractive. The present high price and scarcity of potash salts, however, give an entirely different slant to the subject and one that would seem to present attractive possibilities to groups of contiguous mills having a large scouring capacity.

It would seem as though the desuinting of wool and the calcining of the recovered suint ought to prove particularly profitable for Lawrence mills, with a combined annual scouring capacity of over 100,000,000 pounds of grease wool. They could recover approximately 5,000,000 pounds of potash salts annually, which, at current prices, ought to net a handsome profit in the first year, after deducting the cost of desuinting apparatus and a central calcining plant. Even at present high prices for potash salts it would probably prove unprofitable for any but the largest mills to attempt to recover the same by calcining, but the desuinting process for the purpose of obtaining cleaner wool with a reduced quantity of soap is one that deserves the careful investigation of all wool manufacturers who scour their own wools.

LABOR LEADERS SLIGHTED

Labor union leaders were not consulted by New England textile manufacturers about the handsome advance in wages just granted to some 250,000 operatives in that section, therefore they stand discredited before their members. Owing to dissensions in union ranks these leaders had lost much of their old-time power prior to the granting of this voluntary advance in wages and now they see their slight remaining prestige endangered. It is a serious matter for the many textile labor leaders whose sole, or principal, income is derived from their union activities. To rehabilitate their prestige and income they have only one recourse, and that is to foment a strike in an endeavor to wrest a further and involuntary advance from manufacturers.

To have forestalled such action it might have been diplomatic for manufacturers to have played labor politics, giving the textile union leaders the tip that they were prepared to grant an advance, allowing them to make a formal demand through their unions upon manufacturers, and then making it possible for them to pose as the benefactors of their members and of the very much larger number of textile operatives who are not union members. The wage advance would not have been a cent more than has been voluntarily granted without the intervention of labor leaders, but the latter would have been allowed to "save their faces" and all danger of friction would have been averted.

Manufacturers did not consider the feelings of textile union leaders because, with one or two local exceptions, these leaders have been discredited and their unions disrupted. Outside of New Bedford and Fall River there are no unions warranting consideration; that is, there are no unions that are representative of a large proportion of textile labor either in the two cities mentioned or in other parts of New England. There are many manufacturers who regret this situation, and who would prefer the existence of a truly representative and ably and honorably administered textile union with whose leaders wage and other matters could be amicably discussed and settled as is the case in Lancashire, England. But there is nothing here that faintly resembles the big English textile unions, and there is, therefore, no blame to attach to New England manufacturers for not considering the feelings of labor leaders in announcing their wage advance.

We have already drawn attention to the fact that textile operatives may consider themselves fortunate to have really obtained their advance out of the pockets of mill stockholders, since large numbers of the latter are still going without dividends, or are still receiving the reduced disbursements made necessary by protracted poor business. Should operatives allow themselves to be misled by the interested claims of labor leaders, and follow them in strikes for a larger advance, they will not only lose the benefit of the advance already granted voluntarily, but will lose a portion of their previous wage rate directly proportional to the length of time on which they are on strike. If the operatives are long-headed they will take the five per cent. and await any further voluntary advance that manufacturers may be able to grant later on.

General interest will be taken in the hearing announced for next Friday at Washington before the Ways and Means Committee on the so-called Hill Bill, which provides for a stiff duty on dyestuffs. It is not likely that there will be any violent exception to the proposed rates by manufacturing interests who have experienced the results of Germany's monopoly in the manufacture of coal tar colors. As to the attitude of the Administration not so much is known, and much is likely to depend upon the extent of demand for the new duties as this demand reflects the wishes of their constituents. This factor, more than any desire to assist in the building up of a self-contained domestic industry, is likely to control Congressional action. Whatever may be the final vote on the Hill Bill, there is every likelihood that discussion will be prolonged for the moral effect upon Germany in persuading her to allow shipments of dyestuffs to this country without the receipt of American cotton, to which interchange of commodities England has not conceded.

OBITUARY

Theophilus Parsons

Theophilus Parsons, president and director of the Amoskeag Manufacturing Co. and of the Dwight Manufacturing Co., and treasurer since 1884 of the Lyman Mills, died Tuesday at his home in Boston at the age of 66. He is survived by a daughter, Miss Susan L. Parsons. Mr. Parsons was born in Jamaica Plain, Mass., in 1849, the son of Thomas and Martha (Franklin) Parsons, and he was named for his great-grandfather, who was a chief justice of the Massachusetts Supreme Court. He was graduated from Harvard University in 1870 and commenced his career in the cotton manufacturing business in the Lyman Mills at Holyoke, Mass., of which his uncle, Samuel L. Bush, was then treasurer. After spending two years at the Lyman Mills, he went to Europe to study manufacturing conditions there. He was agent of the Pocasset Manufacturing Co., Fall River, in

THEOPHILUS PARSONS

1880, and in the latter part of that year returned to the Lyman Mills in a similar capacity. On the death of his uncle, in 1884, he was elected treasurer of the company. Mr. Parsons served as president of the Arkwright Club from 1900 to 1910. One of the most important movements initiated by him during his administration of the Arkwright was the organization of its long staple cotton committee, which exerted an important influence in extending the growth of such cotton in the South. Mr. Parsons was director of the New England Trust Co., American Mutual Liability Insurance Co., vice-president and director of the National Union Bank and a trustee of the Provident Institution for Savings.

Crawshaw Wolfenden

Crawshaw Wolfenden, well-known yarn and machinery dealer of Philadelphia, died of pneumonia, on Thursday, Jan. 6. Mr. Wolfenden was forty-nine years of age. He was born in England, coming to this country at an early age. His first connection with the textile industry was with the Excelsior Beaming Mill in Philadelphia. Twelve years ago he started in business for himself, associated with George Butterworth, and he continued for many years at York & Bodine Sts., until last year when he removed to larger quarters in the new Wright Bldg., Broad & Huntingdon Sts. He is survived by a widow and one daughter.

Daniel M. Barr

Daniel M. Barr, a retired textile manufacturer, formerly a member of the Barr Manufacturing Co., worsted goods, Philadelphia, died of pneumonia, on Friday, Dec. 31, aged 43 years.

LATEST CABLE NEWS

Manchester, Eng., Jan. 7. (Special Cable to the Journal).—Actual business in coarse and medium yarns checked, spinners frequently putting prices at prohibitive levels. Good demand for fine counts. Advances on week of farthing to halfpenny per pound paid. Cloths advanced; prices arresting developments. Business limited. India purchases much smaller, but considerable ineffective bidding; China indifferent; other markets unchanged. Buyers regard general price situation suspiciously.

CANVAS FOR MAIL BAGS

Increased Use of Cotton Because of Increased Cost of Leather

WASHINGTON, Jan. 5 (*Special*).—The report of the Postmaster-General will disclose the fact that there will be, from now on, a steadily increasing demand for canvas to be used in the manufacture of mail sacks and pouches. The old practice of using leather mail pouches has been abandoned, not only because of the increased cost of leather, but because the canvas pouch is lighter in weight.

A contract will be entered into in the near future for an all-canvas pouch. In the meantime canvas mail-bags are being purchased for practically all branches of the service.

The experiments made with canvas satchels have not yet been completed, but it is probable in the near future that specifications will be issued for a carrier's canvas satchel, equipped with a leather back (this has been done since the writing of the report in question). Experiments have also been made with a canvas or webbing tie strap, but they have not yet proven to be entirely satisfactory.

Succeeds American Textilose Co.

The American Tire Fabric Company, whose incorporation under Massachusetts laws was reported in last week's issue, practically represents a re-incorporation of the American Textilose Company, Newburyport, Mass. Sometime ago a large part of the machinery used in making textilose was moved to Brooklyn, and the space thus made available was equipped for the twisting and weaving of automobile tire cloth and other heavy combed yarn fabrics. This simply represented an extension of the combed yarn department of the mill, which had been in operation on tire cloth yarns for a long period. The company is said to have its capacity production of tire cloth sold through this year and into the first months of 1917. The company is capitalized at $1,500,000, divided as follows: Seven per cent. first preferred stock, $350,000; 7 per cent. second preferred, $650,000; common stock, $500,000. The officers of the company are as follows: President, J. D. Armitage; vice president, Manning Emery, Jr.; treasurer, Robert N. Donaldson; assistant treasurer, W. F. Warncke. The board of directors consists of the officers and Myron C. Taylor, chairman.

Sale of Thos. Kent Mills

The entire property of the Thos. Kent Mfg. Co., Clifton Heights, Pa., will be offered at public sale by Wednesday, Feb. 2, at twelve o'clock noon. The sale includes all the mills, machinery, real estate, stock in process, manufactured goods, and all assets of every kind and nature, and will be conducted by Barnes & Lofland, auctioneers, in their salesrooms in the Bourse Bldg., Philadelphia. This sale is being held as a result of an agreement made with the stockholders of the company last year, as was announced at that time. By this agreement, Chas. J. Webb, the receiver, took over the property as collateral security in return for assuming all the debts of the corporation, to be held until the first of the present year.

Question and Answer DEPARTMENT

Under this head we undertake to answer, free of charge, to the best of our ability, questions pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD JOURNAL. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

If the question is not of general interest to textile readers and involves expensive investigation, a charge covering the cost may be made, of which the inquirer will be advised before any expense is incurred.—EDITOR.

THE COVERING AND CARE OF COMPRESSION ROLLERS

Technical Editor:

What are the real proportions used and proper method of mixing materials to make a coating of enamel paint for the surface of rubber compression rollers for drawing and spinning frames? Please state how long this coating will last before it requires renewing, and what are its drawbacks, if any? (2560).

The so-called rubber compression roller for drawing and spinning frames is in reality a strong, finely woven canvas webbing, and the coating or enamel is of a specially prepared rubber. This canvas is woven in a circular web and after the rubber composition has been applied, it is stretched on to the boss of the roller. This coating is a thin preparation put on in the same way the coating is put on rubber tires. Strips are cut from the tube just wide enough to cover the boss and are slipped on by being put over a stretcher composed of six or eight flat ribs of steel. Fig. 1 shows a section of the stretcher and roller ready for the covering. A, shows center tube of stretcher long enough at the foot to slip onto the arbor of roller. B, side springs of flexible steel; C, short lugs which rest on the boss and tend to keep all parts firm; D, roller ready for covering. When the stretcher is low-

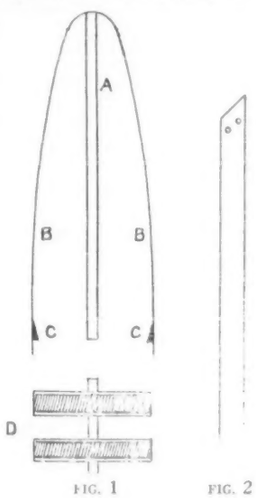


FIG. 1

FIG. 2

ered to the roller the edges of the springs come just over the part to be covered, and a sharp push puts the cover into its proper place. Any first-class rubber firm can supply the tubing.

Several methods have been applied to lengthen the lift of rollers, but up to the present time it is a question whether it has succeeded as well as the old system of self-enamelling by means of a wet sponge and a boxwood rubber, especially in the case of rollers with wooden bosses. A few remarks regarding this may not be out of place at this time.

First, only the best of leather should be used and after it has been cut into the lengths desired, it should be well soaked in water. When recovering old rollers do not take off any more than is required to remove the old glue, leaving the surface of the wood smooth. Do not stretch the leather until it is ready to be glued to the boss. Cut one end of the strip diagonally as shown at Fig. 2. Then apply the thin glue to about two inches of the boss and fasten the cut end with two long nails. Pass the loose end of the leather under the boss and then draw it over the top so that the nails press on the tool rest of the lathe, as shown at Fig. 3. Glue both boss and full length of leather, getting hold of the loose end of the leather with clips and draw down tightly with the foot, Fig. 4. A, is a roller with leather strip, B, drawn over and fastened with one nail, ready for the end

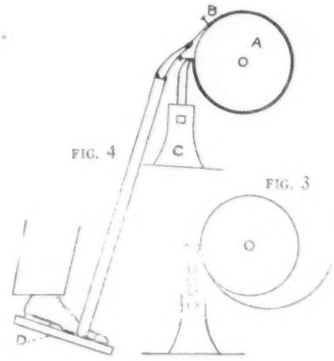


FIG. 4 FIG. 3

to be cut off; C, is the tool rest; D, foot press with strap passing through end of the gripping plyers.

The leather can be stretched as much as is necessary. Put in another nail about 1½ inches from the joint, release foot clip and after cutting to fit, put in two additional nails. Then leave the rollers in a warm, dry place for a few days until the leather is thoroughly dry. The roller is again put into the

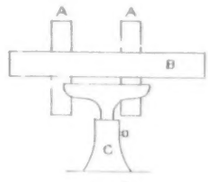


FIG. 5

lathe, the nails drawn and their place taken by shoemaker's wooden pegs. The roller is then trued with a fine tool. Then comes the polishing or enameling. Run the lathe at a high speed and dampen the surface of the roller with a sponge dipped in water, then use a smooth piece of boxwood about two inches square, pressing it hard on the surface of the roller until the required polish is obtained, see Fig. 5. AA, shows the roller; B, the boxwood polisher; C, tool rest on lathe. The polish thus obtained is neither sticky nor greasy.

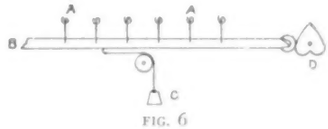


FIG. 6

Never put more pressure on the springs than is required to make the rollers draw an even thread. Neglecting to do this not only shortens the lift of the roller, but adds to the power required to drive the frame. If the rollers are wearing out rapidly due to the scratch fluting in the bottom rollers being out too deeply, have the rollers taken out and skimmed. See that the

(*Continued on page* 33)

New Mill Enterprises, Enlargements and Improvements, Etc.

COTTON

*Kimesville, N. C. Operations are expected to be started this month in a building now being remodelled by the White Manufacturing Co., the incorporation, of which with a capital stock of $50,000, was noted last week. Equipment to be operated consists of 2,000 ring spindles and 100 looms; single 14s yarn will be manufactured. A dye-house is to be operated and the plant will be run by steam power. The officers of the company are: Dr. G. A. Foster, president; H. A. White, treasurer and buyer. H. L. Lance is also interested in the company.

*Statesville, N. C. T. D. Miller and associates have chartered the Millneer Manufacturing Co., with $125,000 capital. Mr. Miller was recently mentioned as planning to build a cotton mill, and this new corporation will construct and operate the plant. J. W. Kaneer and A. P. Barron are among the incorporators.

*Ballouville, Conn. Machinery being installed at the plant of the Ballou Mills of the Attawaugan Co., previously noted, takes the place of old equipment which is being discarded. New equipment includes cards, speeders, pickers, spinning frames and looms. The product of the mill remains unchanged, sheetings, cambrics, twills, shirtings and sateens.

Baltic, Conn. Plans for the erection of an extensive addition to the plant of the Baltic Mills Co. are being prepared by C. R. Makepeace & Co., Providence, it is reported. The company is incorporated for $1,000,000, and manufactures fine lawns, with a present equipment of 30,000 ring and 38,000 mule spindles, 500 narrow and 1,000 broad looms.

*Corsicana, Tex. A new mill to be erected by the Corsicana Cotton Mills, construction on which is to start before the spring, will be equipped with 3,000 to 5,000 new spindles and 100 new looms. The mills are in the market for the service of a mill architect and engineer, and for the following machinery and equipment: Belting, carding machinery, cotton openers and lappers, cotton waste machinery, elevator, a 500 h. p. engine, humidifying apparatus, a pneumatic conveyor, cotton preparatory machinery, rope transmission, shafting and hangers, spinning machinery, spoolers, twisting machinery, warping and beaming machinery. The company, whose present capitalization is $100,000, is erecting the new mill with a view of increasing capacity and adding wide duck to its present product of single filling duck. As previously noted the directors recently declared a dividend of 25 per cent. and authorized the purchase of land upon which the new mill is to be erected. The company first will build warehouses and then construct 100 x 140 foot two-story brick building for mill purposes, these buildings to cost about $25,000. After completing the mill addition about 3,000 spindles will be installed, and later 2,000 will be added to this number, about $75,000 to be invested for mill machinery. Probably natural gas engines developing 500 horsepower will be installed, but the company is also giving consideration to the electric drive.

*Minetto, N. Y. Local authorities have acted favorably on the request of the Columbia Mills, Inc., dividing the town of Oswego, N. Y., and creating a new town of Minetto. As previously noted, the company contemplates the erection of a large mill for the manufacture of fabrics used in their production of shade cloth.

WOOL

*Webster, Mass. The establishment of a shoddy mill at Webster, rumors of which have been heard for about four months, has been definitely decided upon, according to local reports. Daniel E. Cummings, of Oldtown, Me., is at the head of the new enterprise. Several locations for the proposed plant are now being considered, and it is believed that preference will be given to property of the Amos Bartlett Estate on North Main Street. It is stated that two new pickers, motors, and general equipment have been purchased by Mr. Cummings, which will be started up, it is expected, within the next four months. At the start custom work will be done exclusively, but it is expected that the plant will later be enlarged, and a general shoddy, scouring, and cleaning business be conducted. Mills in Webster and vicinity are counted upon to furnish the projected plant with plenty of work.

*Rensselaer, N. Y. Operations were started Dec. 29, on the new mill of Wm. Barnet & Son, manufacturers of wool shoddy; the new plant replaces the one destroyed by fire Feb. 27, 1915. As previously noted, the capacity has been materially increased and a number of improvements have been made in processes of manufacture.

Burmont, Pa. Report has it that the Burmont Mills, containing 5 sets cards and 1,700 wooden spindles, which have been shut down for some time, will be started up again on the commission spinning of woolen and merino yarns.

Methuen, Mass. Installation of a finishing plant was recently completed by the International Worsted Mills, manufacturers of fancy worsted goods. The plant, which operates 26 looms, has been running overtime for a number of months.

KNIT

Fulton, N. Y. The Wm. H. Spanswick Manufacturing Co., which has manufactured a line of children's knit underwear for the last five years at Fulton, may decide to move its plant in the near future to some larger city, where more advantages will be offered than are found in Fulton. The capital stock of the company is held by Fulton people to the extent of one half, the remainder being held by W. H. Spanswick and out-of-town people. The out-of-town stockholders believe the plant should be moved, as they claim that it has outgrown its present location. On the other hand, Fulton stockholders offer the opinion that all inducements required by the knitting company can be found in Fulton, and stand ready to back their opinions by real money. Mr. Spanswick remains neutral and will throw his holding with those who offer the best proposition. The business has been highly successful since the company started, the last year being the most profitable of its existence. When some other plants of like nature were idle, this factory ran nights to fill orders. The annual meeting of stockholders will be held Jan. 18, when an interesting debate is expected.

Des Moines, Ia. Announcement has been made by the Des Moines Hosiery Mills that a mill will be erected at Boone, Ia., a site for which is understood to have been bought. The mills now operate a branch plant at Boone, 90 latch needle knitting machines being installed and about 75 operatives employed. Plans are now being drawn for the proposed structure, which will cost about $15,000 and employ 300 operatives. Men's, women's, and children's seamless and ribbed cotton, wool, worsted, and merino hosiery is manufactured and dye, bleach, and finishing departments are operated. H. T. and R. E. Rollins are the buyers.

Clifton Heights, Pa. Fire of unknown origin starting in the finishing department of the Linenwear Hosiery Co., cotton, lisle, and silk hosiery, recently caused damage estimated at $50,000 it is reported. A portion of the machinery was saved, it is understood.

Somerset, Ky. Swannanon Hosiery Mills have been incorporated with capital stock of $30,000 for manufacturing knit hosiery. Incorporators: Browne Cornelison, John N. B. Barker, and Francis P. Cornelison.

Riverside, N. J. Fire of unknown origin destroyed a five-story brick and concrete building of the plant of Wm. F. Taubel, Inc., hosiery manufacturer, early Sunday morning, Jan. 2. The damage is estimated at about $300,000 in the building and machinery which formed a part of the finishing department of the large plant. The building was comparatively new, having been erected only three years ago, and officers of the company state they are at a loss to account for the rapidity with which the fire spread; the water pressure was so low the firemen were unable to get satisfactory play on the upper floors. Arrangements have been made to have the work distributed in the other buildings of the plant.

SILK

Paterson, N. J. Alfred Bentley, 262 East 30th Street, expects to start a 30-loom broad silk plant in February or March. A location has not yet been decided upon.

Paterson, N. J. J. Jackson has started an 8-loom broad silk plant in the Ashley Mill on Warren Street, under the name of the Excelsior Silk Co. Considerable space is available for more machinery.

*Williamsport, Pa. The new broad silk mill to be started here by a Paterson concern, is headed by C. H. Drinkwater, 951 Fourth Street, this city. Other local men are also interested. It is understood a company is being incorporated to be known as the Keystone Silk Co.

Paterson, N. J. Plans for doubling its floor space are being considered by Samuel J. Aronsohn, Inc., operating the mill at 18th Street and 10th Avenue on tie and dress silks, but no definite decision has been reached, Mr. Aronsohn is quoted as saying. At present 235 looms are operating at the Paterson plant and a branch mill of 300 looms is conducted at Coatesville, Pa.

High Point, N. C. Stehli & Co. will build a $12,000 additional building, having 23,000 feet of floor space. This structure will enable the firm to install new machinery to increase present capacity for silk throwing.

*Hazleton, Pa. Louis Roessel & Co., operating the Hazleton Silk Mill, announce that they have not finally decided on the erection of an addition to this plant. It was reported several weeks ago that bids were being asked for the construction of an addition. As noted, the company has declared incorrect reports that it was to establish a branch plant at Mount Carmel, Pa.

Mystic, Conn. Full time operations were to have been started this week by the Robinson Silk Co. A number of improvements have been made at the plant which include the installation of a quantity of new machinery. Business outlook is said to be bright.

MILL PERSONALS

J. Edward Lee has accepted a position as traveling representative for the Empire Duplex Gin Co., introducing its C. O. B machines to the trade. Mr. Lee comes from Pawtucket, R. I., and is widely known among the trade.

Gustav Jordan has accepted a position as overseer of weaving for the Merrimac Woolen Co., Dracut, Mass. He formerly held a position as loom fixer at this mill.

James A. Grant, overseer of weaving for the Berkshire Cotton Manufacturing Co., Adams, Mass., has been transferred from No. 4 to No. 5 weaving department.

Arthur N. Herson has been appointed overseer of weaving for the Newmarket (N. H.) Manufacturing Co.

Roland Holt, overseer of carding for the Corr Manufacturing Co., Taunton, Mass., has resigned his position at that mill to accept one as superintendent of a mill in Columbus, Ga.

Otto F. Seiferth, overseer of the spooling and warping department for the Jenckes Spinning Co., Pawtucket, R. I., has resigned his position to accept a similar one with the Palmer Mill of the Otis Co., Three Rivers, Mass.

John J. Walmsley, overseer of weaving at the Quidnick plant of the Quidnick-Windham Co., Coventry, R. I., has been promoted to the position of assistant superintendent. He has been connected with the company for the past 16 years. John Nuttall succeeds Mr. Walmsley as overseer of weaving.

J. R. Grubb has accepted a position as superintendent of the Cowpens (S. C.) Manufacturing Co.

J. R. Watson has been appointed secretary of the Cochran (Ga.) Cotton Mills.

J. D. Whitmire has been appointed overseer of carding at the Wallace Mills, Jonesville, S. C. Mr. Whitmire comes from Greenville, S. C., where he has been employed at the Brandon Mills.

S. E. Cooper has taken the position as secretary of the Mississippi Cotton Mills, Moorehead, Miss.

T. H. Henderson has resigned his position as superintendent of the Cowpens (S. C.) Manufacturing Co. to accept a similar position at the Apalache plant of the Victor Manufacturing Co., Arlington, S. C.

W. L. Moore has been appointed overseer of spinning for the Dixie Mill, Mooresville, N. C. He comes from Prendergast, Tenn.

John Wheeler has resigned his position as superintendent of the Grant Yarn Co., Fitchburg, Mass.

Robert Fazackerley has accepted a position as overseer of weaving for the Dominion Textile Co., Montreal, Canada. Mr. Fazackerley worked for this company for several years previous to his coming to the States

Charles Hayes, Jr., has accepted a position as superintendent of the Fitchburg (Mass.) Yarn Co. Mr. Hayes was for a number of years connected with the Skenandoa Cotton Co., of Utica, N. Y.

T. J. Nevins has accepted a position as overseer of weaving for the Cleveland (Tenn.) Woolen Mills. He comes from Milwaukee, Wis.

Arnold Marsland until recently employed by the Armat Knitting Mills, Germantown, Pa., has been made superintendent of the Linenwear Hosiery Mills at Clifton Heights, Pa.

** Indicates mention of project in a previous issue.*

New Machinery and Process DEPARTMENT

This department is designed to present a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to the textile manufacturers. It is not a list of patents but of improvements on the market, the idea being to present to our readers a systematic weekly record of new machinery, etc., of interest to textile mill men.

Whenever possible we endeavor to make a personal investigation of the new machinery and processes described in this department. In the absence of such personal investigation we must necessarily rely upon information obtained from those who control the machines and processes.

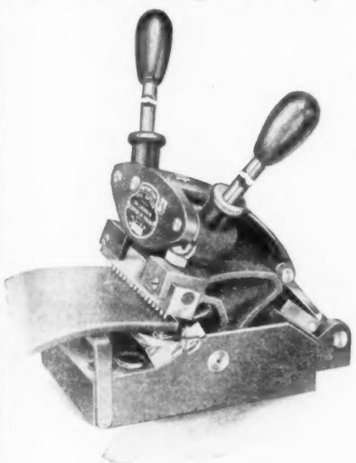
We invite machine builders and others to send us such information for this department.—EDITOR.

NEW "CLIPPER" BELT LACER

A new model of belt lacer, which will be called the No. 3, has just been completed by the Clipper Belt Lacer Co., Grand Rapids, Mich. This new No. 3 "Clipper" lacer is designed to lace belts with greater ease and efficiency than was possible with the No. 2. The entire working parts are made of crucible steel, malleable iron and tool steel.

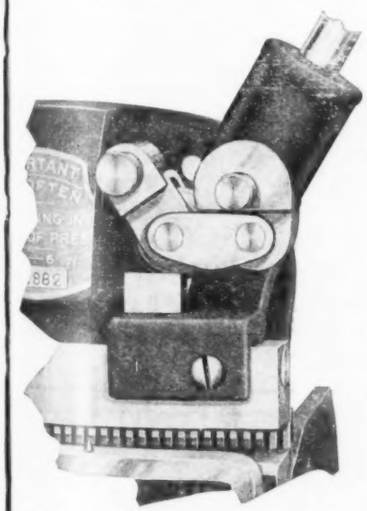
DESCRIPTION OF JOINT

The method of lacing belts developed



NEW CLIPPER BELT LACER

by this company has been very successful for belts running at high speed, for the joint, being flush with the surface of the belt, prevents any jump or vibration, and as it is very flexible, runs over the pulleys smoothly. It is also light and short, so that the liability of slipping is prevented. The joint is made by pressing a row of hooks into each end of the belt, the ends being brought together and the lacing completed by inserting a rawhide pin through the two



TOGGLE CONSTRUCTION FOR DEVELOPING MORE POWER

sets of projecting hooks. Anyone of ordinary ability can make a perfect joint; both sides of the belt are alike, and perfectly smooth; the hooks having a long and a short side, zigzag the lace, thus equalizing the strain; and width or thickness of belt may be laced with the same tool; and the joint is adapted for either low or high speed. The lacer is portable and easily taken to the belt, making it unnecessary to take the belt off the shaft or pulleys.

TOGGLE CONSTRUCTION

Owing to the toggle construction, shown in the illustration, it is easily possible to develop at least 50 per cent. more power for pushing hooks into a belt. An ordinary workman can push six inches of hooks into a belt with comparative ease.

The old No. 2 lacer has been most successful, having been entirely satisfactory in 95 to 98 per cent. of the places where it was tried out, when properly used. The only complaint heard was that the user could not put the hooks in flush with the surface of the belt. This was usually due to the fact that operatives were afraid of breaking the tool. With the new No. 3 "Clipper" this trouble is entirely overcome in two ways; first, the lacer is practically unbreakable; and second, with very slight exertion the hooks can be pressed into a six-inch belt flush on both sides.

Mills for Southwest

In connection with the interest which is being taken in the establishment of textile mills in the southwest territory, it is stated there are but 200,000 cotton spindles and 4,200 looms now operating west of the Mississippi River. Those interested in the movement to bring textile mills into that section declare that such mills will enjoy a marked advantage over established mill centers in view of cheap cotton, cheaper fuel, short marketing mileage for the goods consumed in that part of the country. With existing freight rates they assert they could even compete with New England and meet Atlanta at the Mississippi. In Texas, for example, there are fourteen mills having 104,000 spindles, all in successful operation, except one of about 7,000 spindles, in the hands of experienced management. As another reason for the establishment of these southwestern mills it is argued the trans-Mississippi region contains a population of 30,000,000, three-fourths of whom reside between the Mississippi and the Rockies. There is a large consumption of cotton for domestic purposes, and much of its products are marketed in cotton containers, such as flour, sugar, salt, cement, plaster, field seeds, etc. It is estimated the demand for bags alone in this section is equivalant to 300,000,000 flour sacks of the 50-pound size. Thus Oklahoma, for example, would be an ideal location for cotton manufacturing purposes in their eyes, as it comes in the region where cotton and wheat overlap. It also affords splendid labor conditions, excellent transportation facilities, and cheap fuel. A special inducement is the exemption of cotton mills from taxation for a period of ten years after establishment.

Finishing Plant Auction

Owing to the concentration of manufacturing operations in its five Rhode Island and Connecticut plants the board of directors of the United States Finishing Co. has decided to sell at auction the property of the company at Passaic, N. J., on Thursday, Jan. 20, at 10.15 a. m. The sale will be in charge of J. E. Conant & Co., the Lowell, Mass., auctioneers.

Textile Patents

BRAIDING machines. 1,165,361. W. G. Pegg, Leicester, England.

FABRICS, removing stains from. 1,164,705. G. E. Darrow, Eugene, Oregon.

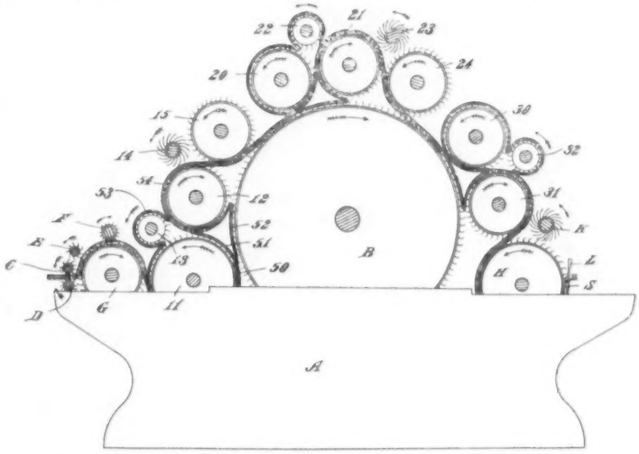
KNITTING machine, lace. 1,165,294. I. Springthorpe, Philadelphia.

PLAITED fabric. 1,164,790. A. H. De Voe, Westfield, N. J.

NEW ARRANGEMENT FOR WOOL CARDING

A new arrangement of rolls and main cylinder on a wool card has been patented, and one construction is shown in the accompanying illustration. The method is described, in part, by the inventor as follows: A relatively large main cylinder is used because the angular relation of a large cylinder to the other rolls is smaller and the danger of breaking the stock is reduced. There is practically no chance of uncarded stock being forced into the teeth and carried along to the doffer for the reason that the teeth of the cylinder rake backward and the cylinder runs at a low speed of ten to fifty feet per minute. Such a cylinder can be easily cleared by suitable rolls running at a relatively low speed if desired.

It is desirable to arrange strippers, workers and other rolls in groups and in such a manner that the stock on the main cylinder will be cleared off entirely one or more times, preferably two or three times between the receiving side and the doffer. The delivery rolls can be so arranged that part of the stock



NEW ARRANGEMENT OF ROLLS AND MAIN CYLINDER ON WOOL CARD

will pass under and back with the main cylinder or so that it will be all cleared off. The rolls are arranged so that there is no clogging of the main cylinder and preferably they are arranged in groups of three or four principal rolls. In a card of this construction the centrifugal force is greatly reduced and there is little stock thrown on the floor, or other waste. The mixing is so effective, it is claimed, that a second breaker is not necessary, saving floor space and power.

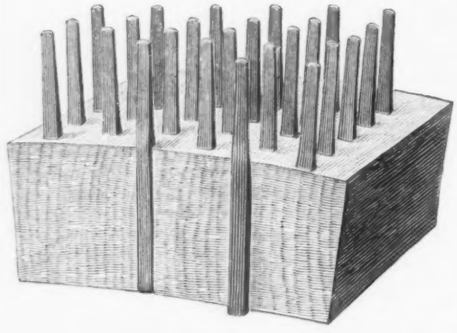
The arrangement of rolls is in general in groups where the first to receive the stock travels faster than the main cylinder, but slower than the succeeding rolls. From the last and fastest roll the stock is removed by a fancy and doffer and returned to the cylinders, or it is taken off directly by similar means, and carried along to the slowest running roll of the next group. With eight principal rolls eight carding points are expected; with nine principal rolls, nine carding points, or in other words at least one carding point for each principal roll. By principal rolls are meant rolls, exclusive of the cylinder, which do not serve merely as feed rolls, bur rolls, fancies, doffers or transfer rolls.

Referring to the drawing, A, is the frame; B, the main cylinder; C and D, feed rolls; E, the stripper for feed rolls; G, the licker-in; H, the main doffer; K, the main or delivery fancy; L, the comb. The feed rolls and licker-in are of usual construction. The licker-in has teeth which pitch forward and travels forward at a speed of perhaps 100 feet per minute. In the construction shown 11 is a tumbler or tumbler worker which has teeth which pitch backward and which travels backward at a surface speed of perhaps 200 feet per minute, that is, faster than the licker-in. As the main cylinder B travels forward at a surface speed of perhaps 12 feet per minute, the stock 50 will be carded between its teeth and those on the first principal roll or tumbler worker 11. The stock 50 which is received from the feed rolls and licker-in is split at the above carding point into two parts one of which 51 remains on the teeth of 11 and the other of which 52 remains on the teeth of B. Both 51 and 52 are stripped and transferred to the second principal roll 12 which travels at a higher rate of speed than 11, say 400 feet per minute, and has teeth which pitch forward and are in stripping relation with the teeth on B and 11. Between first roll 11 and second roll 12 is a third principal roll 13 which is essentially a worker having its teeth pitch forward and in carding contact with 12 and in stripping contact with 11. It preferably travels backward and preferably at a low surface speed such as 12 feet per minute. It must travel more slowly than the roll 12. It cards the stock between itself and 12 and picks up part of the stock 53 from 12 and is stripped thereof by 11. This stock 53 merges with 50 and is recarded between 11 and B. The rest of the stock 54 which remains on 12 is brushed up by a long toothed fancy 14 and is removed therefrom by a doffer 15 by which it is replaced upon the main cylinder. The teeth of this doffer preferably pitch forward and it travels backward at a low surface speed but a faster speed than the main cylinder as say 20 feet per minute. There is a space between this group and the next group, of which the first roll 20, which corresponds with 11, has teeth which pitch backward and runs backward at a similar speed to 11. A second roll 21 which corresponds with 12 has teeth which pitch in the same direction at about the same relative speed. The third roll 22 is a worker which corresponds with 13, has teeth which pitch forward in the same way, and travels at about the same relative speed. The other members of the group are the fancy 23 which corresponds with 14 and the doffer 24 which corresponds with 15. The stock is blended and carded by

(*Continued on page* 48)

Dodge Picker Pins

ALWAYS SELF-SHARPENING



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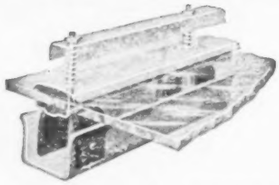
Winter Skylight Problems



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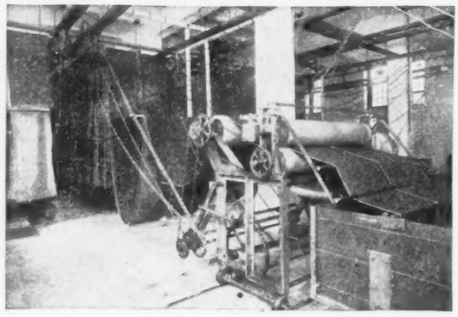

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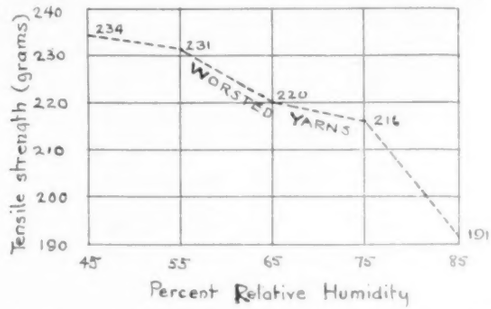
Textile World Journal
TECHNICAL SECTION
This section features each week during January: (1) Cotton Manufactures (2) Wool Manufactures (3) Knit Goods (4) Dyeing, Bleaching & Finishing. Power & Engineering in Annual Review Number, Jan. 15

WOOL MANUFACTURES

Atmospheric Humidity and Strength of Woolen Fabrics

By K. B. Lamb, Ch. E.

FEW realize the great influence that the humidity of the atmosphere has upon the strength of textile materials. The ordinary everyday range of humidity can cause as much as a 20 per cent. change in the strength. The understanding and recognition of this phenomenon is becoming of greater and greater importance, due to the fact that more and more cloth is being bought and sold under definite specifications. This is paritcularly true of the foreign orders which have been and are being placed in this country.



The writer has been in charge of a great deal of the official testing done for the European army commissions during the last year, and has tested large quantities of cloth destined for the Russian, Belgian, French and Servian armies. This army cloth is all bought upon a definite specification as to tensile strength, and unless it complies with the specifications it is not accepted.

When the margin of profit is small, it is usually necessary to work as close to the specification value as is safely possible. It is, therefore, very easy to see how a variation in strength of even less than 20 per cent. might mean the rejection of a perfectly good shipment or sample, or the acceptance of an inferior one.

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As protection against future power troubles, use only

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There is Nothing "BRAND NEW" about our *experience, methods* or our record for honorable dealing. They go back OVER FIFTY YEARS. On the above basis we offer you FEEDERS for *cards, pickers and wool washers* that have stood the test and are not "Brand New" in the sense that you have to *experiment with any of our machines in your mill.*

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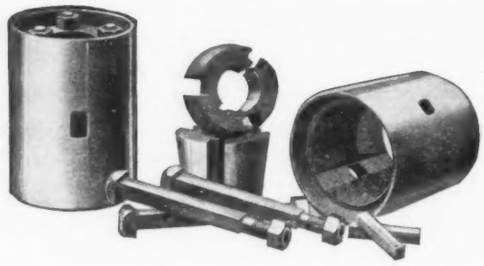

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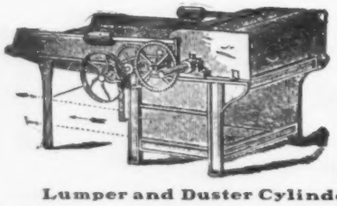

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eral matter is removed along with the d sweat or the wool fat, according its solubility in water or its readiness to emulsify in alkaline detergents.

EMULSIFICATION

Thoroughly to understand what takes place in emulsification, a comprehensive study of the solution in which wool is washed is necessary. From the preceding detailed particulars of wool impurities it will be gathered that only a relatively small proportion of impurity—viz., the wool fat and part of the earthy matter, has to be removed by emulsification, the other part being soluble in water. An emulsion is a liquid distributed throughout another liquid in the form of small drops, the term being usually restricted to cases where emulsion is made lasting. Water is and must be imagined to be made up of tiny particles, round in shape, clinging together by mutual attraction and tending to maintain their shape under all conditions. These particles are capable of unlimited motion where no opposing force (such as gravity) interferes. Imagination pictures them as a dense crowd of people, everyone of whom is endowed with unlimited motion, so that he may push his way through the compact mass without disturbing its general appearance or affecting the direction in which it is streaming. Wool placed in water is opened out, and the water surrounds every fiber. Another way of putting it is that the wool staples push on one side the water particles, which are displaced by individual fibers even so that the wool floats about between them. This condition places the cleansing agents added to the water in contact with the wool impurities contained on each fiber in such a manner that they can perform their allotted functions. This molecular formation of water, and the fact that soap and alkali solutions further subdivide or insert themselves between the water particles, contributes to the removal of the wool fat.

PHYSICAL FORMATION OF WATER

The study of the physical formation of water does not end here. It is easy to understand that if the mutual attraction of the water particles is lowered by the addition of soap and alkali, a new solution is formed which is more easily penetrable, and in consequence more effective in reaching every fiber of the wool staples. The mutual attraction of the particles causes them to occupy as small a compass as possible, and induces what is known as surface tension. This can be defined as a resistance to any force tending to disturb the smoothness of the surface, which is dependent on the attraction of the particles for each other. The addition of soap and alkali to the water lowers the surface tension and gives greater freedom to the particles of water for the opening and cleansing of the wool. In order to realize the full importance of the molecular condition of the scouring liquid in wool cleansing the practical man is asked to imagine what would be likely to happen if the wool to be cleansed were placed in a fluid such as varnish! The diluting of water with alkaline detergents and the heating of the mass to, say, 125 deg. Fahr., increases its permeability and renders it more suitable for quick dirt removal. There is a further benefit resulting from pedesis. Pedesis is the rapid oscillation of particles in a liquid which is increased by the application of heat. Referring to our simile of particles as crowds of people, we may put it in this way. In order to keep a "live" action amongst the particles of water, two policemen are on duty—P. C. Alkali, who says, "Don't crush," and P. C. Heat who bids them "Move on."

(*To be continued*)

Complicated Draft Problems

By Roxburgh

NE source of difficulty to drawer-in and weaver is a complicated draft. The drawer-in is likely to make a wrong draft, and so cause trouble for the overseer, and the weaver may take in broken ends on the wrong shafts and thus make a damaged piece. Easily followed drafts are so desirable that the designer may go out of his way a little to secure them. At one of my classes I was explaining how to make squares of 2 by 2 twill and hopsack. I showed it on eight shafts, and a more knowing student suggested that I might show how it could be woven on six shafts. I replied that it was not worth making a difficult draft for the sake of saving two shafts. The gain was small, the risk great. At a place where I was working I found a rather peculiar draft, shown at Fig. 1. This did not look like a draft that any one would make at first hand; it was as if it had been obtained by dissection and began at the wrong place. And so, indeed, it appeared to be, for a little rearrangement made it quite simple and easily carried in the mind. The weave was then seen to be broken plain cloth, as shown at Fig. 2.

HOW DRAFTS MAY BE SIMPLIFIED

There are many weaves made on a large number of shafts which with very slight alteration can be much reduced. Sometime ago at an exhibition I saw a diamond weave on 2 by 2 ground made with nearly double the number of shafts really necessary. It was on something like 24 shafts and the alteration of a few marks, making an undiscoverable change on the weave, would have brought the design within the compass of 14 shafts. The simple detail overlooked was the well known device by which almost any design composed of right and left twills and hopsack may be made with one-half the ends on two shafts.

Fig. 3 is an example of this method of arrangement. It is a diagonal on 24 ends, in which the ends marked x, can be woven on two shafts, the remaining 12 ends each on a separate shaft, making 14 shafts in all. But this is not all. A slight alteration that will not show in the cloth will bring the shafts down to eight, or on a simpler draft, to 12 shafts.

In Fig. 4 the change is made in sections of four ends, so that section 4 is section 1 reversed, etc. The arrangement illustrated by Figs. 3 and 4 can be used with success in making large designs in many different forms with comparatively few shafts.

MAKE THE RANGE SIMPLE

In writing instructions for ranges great care should be taken to make them as easy as possible for those who have to carry them out. For example, if the pattern is small and the weave plain and an overcheck is to be put in, it will be better for the warper to warp the range without the overcheck, but if there is a weave, say a herringbone or hopsack stripe, it will be better to warp it with the overcheck, so that the color may be a guide to the drawer. This is more especially desirable if the draft is difficult. The drawer has to count his ends one by one and the presence of the colored end falling always on the same number is a good guide for him. It may be given as a good rule that the full pattern ought to be warped so that each person who handles the range may have the whole before him, and especially that the loom may not be kept waiting while the colors are being tied in.

PATTERNS MAY BE MADE EASIER

In arranging patterns the designer can often do something to make easier the work that follows. Peggings and picking chains should be short. Nearly the last piece I wove was a Glenurquhart check made as follows:

32 { 4 black, 4 grey
30 { 3 black, 3 grey

The shuttles changed sides at the end of each pattern and in a power loom the picking chain would have been 124 lags. If the designer had made the 3 by 3 part for 36 the shuttles would have finished where they began and only 68 lags would have been necessary

48 { 4 black, 4 grey, 3 black, 2 grey, 2 black, 2 grey, 3 black, 4 grey

Another range could then be woven, and afterward a third could be made as follows:

16 { 4 black, 4 grey, 3 black, 2 grey, 2 black, 2 grey, 3 black, 4 grey

In normal times these three ranges

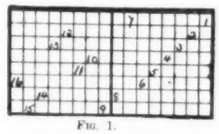
Fig. 1.

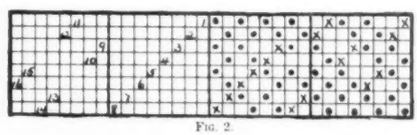
Fig. 2.

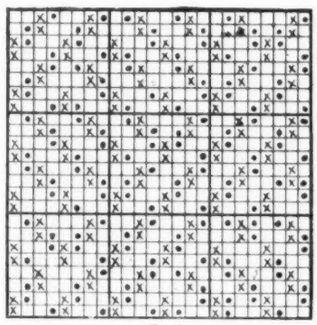
Fig. 3.

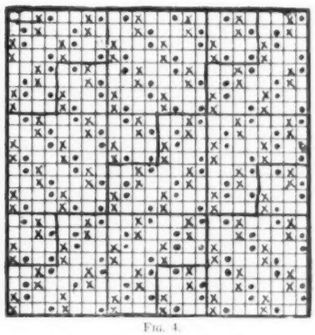
Fig. 4.

and no difference would have been noticeable on the design. A little care in this direction may often lead to economy of labor.

ECONOMY IN RANGE MAKING

Range making is an expensive item and every care consistent with making ranges good must be taken to keep down unnecessary expense. The best method of making depends on how the goods are to be shown. Most are shown in the whole range; some are cut and only selected colors offered. When they are shown whole they must be short; that is, about a yard. Economy in making can be effected by weaving several on the same warp. Say the warp is in Lovat mixtures, the filling of the first range would be the same as the warp; another range could follow with brown mixtures, another with olive mixtures and another with grey; either with the same, or by preference, with alternate stripes or checks. Or, again, the warp may be drawn on eight shafts and some of the ranges made 2 by 2 twill and others made in herringbone or hopsack stripes. And thus on one warp a number of different ranges can be made.

ADAPTED TO SMALL CHECKS

With small checks of the four black and four grey order, the warp would be a graduation running from medium to dark grey and the filling the same. When one range was woven the warp could be changed to the following:

could be repeated with fancy colored overcheckings. It will be noted that these changes involve the alteration of very few ends, although the difference is very marked.

When fancy colored overchecks are used on a range of various depths of ground it is impossible to make every pattern good. But it is always worth some little trouble to prevent any from being very poor. The first feature of a range the prospective buyer sees is an undesirable color. There may be many good ones when he looks for them, but a poor one strikes his eye immediately. It is, therefore, good economy to put the checks in by hand, rather than shuttle them across to keep out disagreeable crossings.

DESIGNER SHOULD SEEK CO-OPERATION

I have left the human element to the last. In pattern making it is a great help to have a sympathetic staff that will take an active personal interest in the work, observant to notice and report any undesirable color that might appear. The most careful designer may make mistake. He is happy if he has a staff that will assist him in his efforts to make as few as possible. To obtain such a staff the designer must be sympathetic toward them. He must not set himself up as belonging to another order of beings or he will be disliked. He must see that his assistants are paid well and otherwise treated justly.

Kinks on Wool Carding

By Bandello

THERE have been inventions in carding, such as ring doffers, rubs, condensers, feeds, double rub aprons and additional rolls to increase the amount of carding surface, which have improved the work and increased the production. Still, there is a limit to the carding surface and to the production of the machine and where over-carding is practiced it often results in pulverizing the fibers. The latest types of cards are fitted with many valuable attachments. Still there is little more stock put through and the fibers often receive a large amount of over-working which results in weak yarn. These attachments have been applied chiefly for the purpose of increasing the production, which is difficult owing to the limitations in the capacity of the main carding parts.

(*Continued on page* 49)

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WOOL MANUFACTURES—Continued—(Men's Wear and Dress Goods Markets)

WOOLEN MILLS EXPECT UNUSUALLY BUSY SEASON

High Price of Worsteds Expected to Force Woolens to Front—Fixed Prices Hamper Distribution

The relative strength of woolens and worsteds for the coming fall season is an interesting question under present conditions, as there are many factors to be reckoned with that do not normally require consideration. That prices on both fabrics will appear high to the buyer is a foregone conclusion, but as to whether the high price will result in a diminution in the yardage of worsteds sold and a corresponding increase in the quantity of woolens is a question that admits of much diversity of opinion. It is necessary to go back only a few years to find prices on practically the same level as will be quoted for the next fall season on wosteds, while woolens were relatively lower, but at that time worsted mills were much better supplied with orders than were makers of carded woolens. Past experiences would, therefore, indicate that the price factor is not the all-important consideration with the buyer, the element of style having fully as great, if not even more importance.

FIXED PRICE SYSTEM

The growth of the fixed price system of merchandising is a factor that will materially affect the marketing of certain cloths, as the increased price will place them out of the range that the manufacturing clothier considers he can use in lines that sell in quantity. The inevitable result will be that the ultimate consumer will either be compelled to pay more for a suit, or obtain an inferior suit for the price formerly paid. The only alternative is to change the fabric, buying a woolen instead of a worsted. It is a fact that owing to the difference in the processes of manufacture, it is entirely feasible to produce a relatively better cloth at the same price in carded yarns than can be made from worsted, or, to put the matter in another form, it is possible to produce a cloth of equal quality at a lower cost. True, the same clear cut pattern and snappy design cannot be produced in the carded fabric, and if the style feature is to be the dominant factor an effort will be made to purchase a worsted that will come within the price limit. If this is done the depreciation in quality will be evident to any one, even if he is not especially familiar with fabrics.

THE RISE IN RAW MATERIALS

The unfortunate feature of the coming season from the viewpoint of the woolen manufacturer is the fact that his raw materials have advanced in a far greater ratio than have worsted yarns, so that there is not likely to be the same relative disparity in price of the finished cloths as in former seasons. The advance in 2-40s half-blood, for example, a standard men's wear yarn, is practically 20 per cent. since a year ago, while many grades of material used in carded woolens have doubled in price and a few stocks have trebled in value. A spirit of optimism is prevalent among woolen men in spite of the difficulties presented by present conditions, the general opinion being that every available loom will be required to meet the demands of the trade. It is expected that competition for business will be less than usual both on suitings and overcoatings, as it is understood that a large number of woolen looms are under engagement for months to come on foreign orders.

MEN'S WEAR TRADE NOTES

H. B. Shaen is showing lines of overcoatings at $1.50 to $1.75.

From present indications mills showing overcoatings that are at all attractive will have no trouble in securing orders to keep their machinery fully employed through the coming season. Buyers are purchasing larger quantities than usual and contrary to the usual custom, revision of orders is being practiced by the mills. The most drastic revision noted thus far was the reduction of an order from 40 pieces to eight.

Kenyon & Childs have opened one line of plaid-back overcoatings and a line of through and through fabrics.

Strong, Hewat & Co. have advanced prices on all spring lines 5c. per yard.

ARMY SUPPLY BIDS

Philadelphia Opening on Large Quantities of Cotton and Woolen Goods

PHILADELPHIA, Jan. 5 (*Special*).—Bids were opened at 11 a. m. to-day at the office of the Depot Quartermaster, U. S. Army, for large quantities of cotton and woolen goods, the following being received:

On 200,000 yards olive drab melton: S. Slater & Sons, Inc., 30,000 yards, $2.49; Henry T. Kent, 100,000 yards, $2.75; Pontoosuc Woolen Manufacturing Co., 25,000 yards, $2.44; American Woolen Co., 100,000 yard lots, $2.175 and $2.20; Clinton Woolen Co., 40,000 yards, $2.275, 30,000 yard lots, $2.345 and $2.395, or 100,000 yard lots, $2.33; Worcester Woolen Mills, 25,000 yard lots, $2.295, $2.395, $2.525, $2.625; J. & J. Dobson, 75,000 yard lots, $2.51 and $2.56, 50,000 yards, $2.61.

On 250,000 yards shirting flannel: Windsor Manufacturing Co., $1.0475; S. Slater & Sons, Inc., 51,000 yards, $1.04 7/10; American Woolen Co., 150,000 yards, $1.30; Peace Dale Manufacturing Co., 100,000 yards, $1.14, 25,000 yards additional, $1.17, 50,000 yards additional, $1.195; Henry T. Kent, 50,000 yard lots, $.99, $1.01, $1.03, $1.06, $1.07.

On 500,000 yards 12.4 oz khaki duck: Fred S. Bennett, 30,000 yards, 25.34c., 250,000 yards, 25.85c., 220,000 yards, 26.38c.; John H. Meyer & Co., 100,000 yards, 25.75c., 100,000 yards, 25.95c., 100,000 yards, 26.15c., 100,000 yards, 26.25c., 50,000 yards, 27.42c., 50,000 yards, 27.52c.; Otto Goetze & Co., 28.6c.

On 100,000 yards 8 oz. khaki duck: Fred S. Bennett, 16.9c.; John H. Meyer & Co., two samples, No. 1 in 25,000 yard lots at 17.55c., 17.58c., 17.65c. and 17.73c., respectively, or No. 2 in 25,000 yard lots at 16.85c., 16.89c., 16.93c. and 16.99c., respectively; Otto Goetze & Co., 18.11c.

On 600,000 yards olive drab cotton cloth: Otto Goetze & Co. bid on 100,000 yards, submitting three samples at 17.71c., 18.21c. and 18.71c., respectively; John H. Meyer & Co., 100,000 yards at 17.55c., 100,000 yards, 17.85c., 100,000 yards, 17.85c., 150,000 yards at 18.15c., 150,000 yards at 18.45c., 50,000 yards, 18.95c., 50,000 yards, 19.25c.; Jos. N. Snellenburg & Co., 100,000 yards, 19.25c., 100,000 yards, 19¾c., 200,000 yards, 19.5c., 200,000 yards, 19.75c.; J. Spencer Turner submitted bid for 68,000 yards, 17½c.

Confer for Relief of Dye Shortage

A conference of representatives of nearly fifty industries affected by the shortage of dyestuffs was held under the auspices of the National Association of Clothiers at the rooms of the Merchants' Association, in the Woolworth Building, on Wednesday. David Kirschbaum presided and William Corwine was secretary. Mr. Corwine reported that he had visited the British Embassy at Washington last week, and had received assurances that the needs of the domestic trade would receive consideration shortly. It was voted to appoint a committee of seven to interview Count Bernstorff relative to what could be done to secure Germany's consent to shipments of dyes and to take the matter up with the Department of State, and, if they thought best, with President Wilson. It was also voted to recommend strongly the passage of a bill along the lines of the Hill Bill, assuring protection to a domestic dyestuff industry. A hearing on this bill will be held on Jan. 14, when a large delegation from the textile and other interested industries will appear to urge its passage.

SPRING DRESS GOODS ARE IN ACTIVE DEMAND

Early Deliveries Wanted on Duplicates—Stocks Are Cleaned Up to an Extent Rarely Seen

The most prominent feature in the dress-goods market is the continuance of the active demand for spring merchandise, orders coming from all sections in much greater volume than is usual at this season. Price advances have been made by practically every house in the trade, but sales are little interfered with, if indeed they are at all affected. One of the difficulties of the situation lies in the fact that there are concerns which, while fully aware that the advances thus far announced are not at all commensurate with the increased cost of production, hesitate to name prices that would mean a legitimate profit. As a natural consequence, prices are determined to a great extent by such makers and the trade as a whole is the loser.

COMPETITION KEEN ON STAPLES

The foregoing is more especially true of staple and semi-staple products, on which competition is keen at all times. The maker of novelties, on the other hand, has a far better opportunity of clearing a profit, as the buyer is not as readily able to determine relative values, paying for style and novelty rather than for intrinsic worth. Skating cloths continue to lead in demand among novelty fabrics, an endless array of these in various textures, weights and materials being shown by a large number of houses. Fortunately, white stocks can be used for at least 50 per cent. of the total material, so that the dyestuff problem is not the factor in the manufacture of these goods that it is in the production of piece dyes or cloth made entirely from colored stocks.

FINE GOODS ACTIVE

On the finer lines of dress goods an excellent business is in progress, failles, broadcloths, and a few specialties selling particularly well. One house that opened lines a week or two ago accepted all the business it cared to take, withdrew the line, later reopened at higher prices, and has received a very satisfactory volume of orders at the advance. Apparently there is renewed interest in export business, or rather foreign buyers are making greater efforts to obtain merchandise. During the week several buyers from Canada and South America have been in the market for both dress goods and men's wear. Canadian buyers report that they will not be able to obtain a piece of the goods ordered from England, and are forced to supply their wants in this market. A similar condition of affairs prevails in South America, and merchants from the countries on that continent are purchasing considerable yardages of woolens and worsteds.

DEARTH OF STOCK GOODS

With all the complexities and worries that accompany the present situation in the trade, there is one feature that affords the sales agent no little pleasure, which is the entire absence of stock goods of any kind. It is perfectly safe to say that at no time in the history of the trade has there been such a thorough clean-up. Most of the mills are well under order for spring and anticipate a large fall business. Evidence that stocks are low in the hands of secondary distributors is to be found in the fact that they are all insistent on early deliveries and are duplicating freely.

DRESS GOODS TRADE NOTES

The Forstmann & Huffmann Co. has advanced prices on its lines of worsted warp broadcloths. Present quotations are: Imperatrice, $2.12½; Patricia, $1.95; Beatrice, $1.70; Geralda, $1.57½; Priscilla, $1.50, and Columbia, $1.40.

Holden-Leonard Co. is to occupy new quarters on the twelfth floor of the Victoria Building, Twenty-seventh Street and Fifth Avenue.

C. Bahnsen & Co., in Department A, are specializing on the finer dress materials, and are meeting with gratifying success. Features of the spring business in this department are shepherd checks and men's wear serges at $1.37½ per yard. For fall a complete line of plain and fancy velours will be shown, ranging in price from $1.25 to $3.50.

White gabardines and white Bedford cords are among the best sellers.

A new skirting shortly to be shown by a domestic maker is of distinctly novel character. The fabric is made in such a manner that half the width is of one color, preferably white or a decidedly light shade, the other side a contrasting color, blue, rose, or any of the colors prevailing in dress fabrics. In use, the breadths of the skirt are cut crosswise of the piece, so that the effect produced is similar to what would be obtained by using two distinct cloths.

Broadcloths are much in favor just at the moment, but there are strong indications that the velour will prove a formidable competitor in the near future. Some neat effects in checks and plaids are now on sale, and it would not be at all surprising to see velour stripes featured.

OVERCOATING LINES OPENED

Buyers Anxious to See New Fabrics—Orders Proffered on Selection

Openings of lines of manipulated cassimeres, cotton worsteds and overcoatings have been the chief features of a rather quiet week. There is a great diversity of opinion among sales agents as to the advisability of early showings and as to the stability of orders placed before lines are completed and opportunity is afforded for comparisons. Buyers have, in many instances, been very insistent on seeing whatever the salesman had on hand, fabric ends or blankets, or, in lieu of the latter, the blanket clips. Orders have been proffered on styles selected from the clips but in many cases the seller has refused to entertain them as he considered them of extremely doubtful value.

Reports are circulated that certain lines have been entirely sold up without having been formally opened, and, in rare instances, this may prove to be the case. The real status of affairs probably is that these lines have been offered more as a test of the market and to get an idea of the buyer's attitude as to prices. A limited amount of business has been taken and lines temporarily withdrawn, creating an impression that a much larger volume of business has been accomplished than is actually the case. On the other hand, there are several lines under order for the entire season, with a lesser number that are largely oversold. One well-known house, showing a line of manipulated fabrics on tabulation of the orders taken finds that they are forced to reduce quantities 40 per cent.

The element of uncertainty as to what may be the outcome of the acute situation on colors is the disturbing factor with the majority of sales agents. A few state that their fabrics for the

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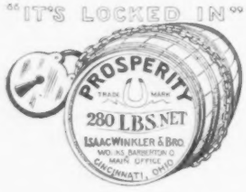

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are all made easier; the results are better, the relative cost pleases, the goods show that the "locked-in" ammonia does a work you have been trying to do for years.

Ask questions. Better still, order a trial barrel under our guarantee of satisfaction—we have a warehouse near your plant. Order today and delivery will be made to your plant quickly.

Isaac Winkler & Bro.
Manufacturers
Prosperity Textile Soda
and
Prosperity Soda (Blue Label)
CINCINNATI OHIO

entire season will be full alizarine dyed, but there are very few concerns that are in position to make such a guarantee. Buyers are fully aware of the difficulties confronting the mills, and are disposed to take a philosophical view of the situation as they are convinced that their competitors will have no advantage over them in this respect.

There seems to be a disposition on the part of many salesmen to postpone the opening of lines. Several that were to be opened last week, according to previous report, it is now definitely decided will not be shown for at least ten days or two weeks.

SPRING GOODS ADVANCED

Price advances on light-weight lines have not had any apparent influence in reducing the amount of duplicate business which is generally regarded as excellent evidence that the high price levels on fall goods will have little, if any, effect on the amount of business placed. An interesting question is that of relative values. In normal seasons the disparity in price between worsteds, woolens and manipuated cloths is very marked, but the present season acknowledges no precedents, the relative advances on the various classes of fabrics having nothing in common. The raw material used in the various cloths have shown very different percentages of increase in price, which must of necessity be reflected in the price of the fabrics made therefrom. As a result the extremely low grade cloths are likely to show much greater advances in price than the high grade worsteds and woolens, in fact, some of these will be close to double the figures of a year ago, while worsteds are expected to show an advance of from 25 to 30 per cent.

Tariff and the War

Joseph D. Holmes, well known in the woolen commission field, has addressed the following letter to Representative R. Wayne Parker, on the dyestuff situation and legislation connected therewith. The letter follows:

There seems to be an attitude among the Free Trade Democrats in Washington to confuse the tariff question by a lot of loose talk about "dumping." This latter, as of course you know, is an expression used to designate shipping goods into any country below the regular price, either to get rid of a lot of undesirable merchandise, which was the original meaning of the term, or to injure competitors in the same line of industry in another country.

The writer cannot see how any "anti-dumping" legislation can be considered an adequate substitute for properly framed measures of protection, under which a domestic industry can flourish in competition with the lower cost of similar products made abroad.

Much has been said about the large development of the dyestuff industry, and the stimulus of the enormous advance in price which has taken place since the German dyestuffs are no longer available here. When normal conditions return, after peace is declared. the foreign source of supply will again be open, and our market, the largest and most valuable in the world, will again be receiving these products.

There is no point in considering any question of "dumping," or of any quotations being made by foreigners to capture our market, or to injure our industries. If foreign goods are sold in this country at the same price as at home, no "anti-dumping" law would apply, and these prices, it is well known, are much lower than our manufacturers could make in competition.

I instance one of the most univer-

(*Continued on page 27*)

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FOREIGN MARKETS WOOL, YARNS AND PIECE GOODS

LONDON SALES CONTINUE WITH STRONG PRICE TREND

Slight Irregularity in Selections Gives Appearance of Unsteadiness—Russia Buys Good Grades

(From Our Regular Correspondent)

LONDON, ENG., Dec. 16.—The market for Colonial wool had been increasing in vivacity and stiffening in price up to Friday, Dec. 10. On Saturday the usual effect of the long week-end was discernible. Buying as a whole was still keen and eager, and instances occurred where higher figures than ever were attained. At the same time, however, there was occasionally a lot which did not seem to catch the fancy of any one and therefore had to be withdrawn, while here and there a parcel did not sell quite up to the rates of the preceding day. The arrangement of holding no auction on Monday naturally caused a great increase in the number of buyers who spend the week-end at home.

RESUMPTION OF SALES

At the resumption of the sales on Dec. 14 the number of buyers present was large, although the sale-room was not as full as it has been recently. To some extent this was due to the character of the day's offering. Crossbred wool of all grades and lengths in the sliped state were abundantly represented, and the style and character of the wools left little to be desired. Some of the shipments were superior in length and condition to any thing previously seen at these sales, causing the price of half-bred lambs to reach 26d., superfine crossbred, 25d., and three-quarter bred, 24d. Even Lincoln and Leicester grades went to 22 and 23½d. respectively. The selection of raw material of merino quality was of decidedly less attractive character. Most of the combing sorts consisted of West Australian produce in the grease, none of which attained any high grade of fineness. For those buyers who must have something higher than an average 64s there were only a few lots of scoured, and these were appropriated by Russia.

BETTER SELECTIONS ON SECOND DAY

The next day the sale-room had quite filled up again, the attendance being as large as on any day of the previous week. A number of fresh buyers were in evidence taking the place of those who, having covered their requirements, had finished their wool buying for 1915. The quantity brought to the hammer was a large one for these times, 9,500 bales, and to a large extent it consisted of decidedly attractive raw material. Merinos afforded the best selection that has been seen during the course of these auctions. West Australian greasy flocks formed the most numerous element, and while the wools made no pretensions to high quality, they were well-grown, sound in staple and mostly in reliable condition.

GOOD LOT OF RIVERINA

In addition to these there was an important flock of new clip Riverina wool in one of the catalogues. It could not claim much quality, but it was of excellent warp character, and in the matter of condition was much above the average. Its drawback was the presence of a large quantity of burr, but it can scarcely be said that this proved much of a deterrent to buyers, seeing that the combing lots realized 18½d. per pound, while the pieces in which the percentage of burr was immensely heavy, sold at 14½d. The cream of the day's offering was the N. Z. & A. Land Co.'s Goondoo back flock from New South Wales which, regarding breed, quality, growth and shrinkage, is the best wool that has passed the hammer thus far. That its attractions appealed forcibly to buyers may be gleaned from the fact that the first combings sold from 18½ to 21d., while the necks, of which the condition was also excellent, made from 17 to 18d., and the broken from 15 to 17d.

In the case of Australian scoured merinos Russia continues to lead the van, allowing scarcely any superior lots to go past her. For the Gibb mark, from Port Philip, Russia has paid up to 3s. 2d., and there is little in the way of Queensland and that she does not secure between 2s. 6d. and 3s.

YORKSHIRE SPINNERS ACTIVE

There is the greatest eagerness by Yorkshire spinners to secure wool of sound combing character, and prices of anything of this kind are invariably run up by a few bidders far beyond what might be called the general price of the room. This has a curious effect in the selling of scoured skin sorts, for, while the first lot or two of a mark may run to 2s. 6d. or more, the following ,though quite as good in every respect but length of staple, drops to 2s. or even less.

In the crossbred department slipe wools continue to offer by far the amplest selection. The get up of the majority of them is excellent, and the bulk of the wool now coming forward presents a most useful length of staple. America has taken a few lots of higher medium grade, but the bulk of the buying is being done by Great Britain, and it is surprising with what ease Yorkshire, Leicestershire and Scotland absorb the extensive supplies brought to the hammer daily. Up to the present there is not hint of satiety, for fresh competitors are joining in each day, and prices still exhibit the hardening tendency which has distinguished them ever since the sales began. Scoured crossbreds, which are offered in moderate quantity, fully maintain the high level which they attained last week, and the relatively meager supply of greasies is eagerly snapped up at fancy figures.

On the evening of Dec. 16 a still higher level was reached for Australian merino greasy, the best lots of the Midkin mark from New South Wales realizing 21½d.

Wools believed to have been purchased on American account are as follows:

	Bls.	Price. d.
<C. F. M> New Zealand, slipe, superfine, x-bd	28	23
<K.> Belfast, Port Phillip, scoured, D combg	29	15½
Euston Llanillo, Sydney, grsy, AA., cbg, E. Hgts.	32	17½
Euston Llanillo, Sydney, grsy, AA., cbg, E. Hgts.	32	18
Clutha, Queensland, scoured, AA., ewes	24	29½
F. & F. A. C., Nollingham Downs, Sydney, grsy, AA.	45	16½
<C. F. M.> Fairfield, New Zealand, slipe, x-bd, superfine, lbs.	29	23½
(+) T. T., West Australian, grsy, 1st cbg, H.	45	15½
(+) T. T., West Australian, grsy, 3rd cbg, H.	25	13½
J. H. D., Falkland Islands, grsy, x-bd, clean	33	18
Pebble, Falkland Islands, grsy, A. Romney, W.	45	18
F. I. C., Falkland Islands, grsy, A. Romney, W.	45	17½
<N. A.> Falkland Islands, grsy, A. Romney, E.	62	16½
Mt. Abundance, Queensland, grsy, 1st cbg, E.	24	20
Thurulgoona, Queensland, scoured, B. pieces	90	19
Coogee, Sydney, scoured, 1st cloth.	29	17
▲ C. M. Co., L., New Zealand, slipe, x-bd, lambs seconds	44	18
▲ C. M. Co., L., New Zealand, slipe, super, ¾-bd lambs	34	22½
St. Lambton, Queensland, scoured pieces	24	15
Toorale, Port Phillip, scoured, stained pieces	30	23
Katandra, Queensland, scoured, 2nd pieces	27	27½
Cordillo, Adelaide, scoured pieces.	26	23½
Cordillo, Adelaide, scoured, locks.	23	22
<C. F. M.> New Zealand, slipe, superfine, x-bd lambs	33	23½
<E. F.> Belfast, New Zealand, slipe, superfine, x-bd lambs	49	23½

COPT.

IMMENSE CONSUMPTION AID IN ADVANCING WOOL PRICES

London Sales Continue to Boom—Merinos in Strong Demand—Licenses Freely Granted

(From Our Regular Correspondent)

BRADFORD, ENG., Dec. 18.—The sales have been continued this week under favorable conditions, there being no complaint to offer on the ground of attendance, competition or prices paid. Business is good in consuming centers, and there is apparently no end to the purchasing power of the home trade. France would be better if more machinery were available, and it is going to be a problem with the Allies to get the Germans out of Northern France without damaging the mills. So far the factories appear to be intact, but one hardly knows how they will fare when pressure is brought to bear upon the Germans to compel them to retire from Roubaix, Tourcoing and Verviers. In the absence of authentic particulars one must refuse to give credence to the wild stories about mills being robbed of working parts, and conclude that factories are still in working condition.

MERINO WOOL SELLING AS WELL AS EVER

There is still an undiminished call for good wool on the market and prices are as firm and as high as they were a week ago. During the week there have been offered some acceptable lines of new clip wools, with no Australian State receiving preference. A buyer to-day must be prepared to pay at least 1s. 7d. for decent shafty greasy merinos, and with a clean yield of 48 to 50 per cent. these wools would be called cheap. As far as one can calculate tops made from good fleece wool are to-day going to cost any where from 3s. 7d. to 3s. 9d., yet men are buying apparently as unconcernedly as if they were costing 1s. 6d. Everyone seems to be impressed with the solidity of present prices, and there is no doubt a healthy trade proceeding in consuming centers which is giving impetus to Coleman Street as well as in Australian and South African markets. Good greasy combing merinos are 1½d. to 2d. above last sales, medium wools are 1d. to 1½d. dearer, and even faulty pieces and bellies are often the same. Scoured merinos are again fetching extraordinary prices, 3s. 2½d. being registered as high water mark for Australian scoured skin wools. Sydney scoured skin wool offered the same day, however, made only 2s. 2d., and where the shilling difference per pound comes in, no man can say. Still there is the fact.

RECORD PRICES FOR CROSSBREDS

The scrappy nature of the crossbred offerings is to-day a pass-word among buyers and only on one or two occasions have there been catalogued wools which can be called straight lines. It is more or less difficult to say what the advance is for these crossbreds. Some recased Dunedin crossbreds were offered a week ago, and particulars of the wool are given below, as an example:

Description.	Quality.	Yield. Per cent.	Dec. 10. d.
Grease 1st half-bred comb.	58s	62-63	21½
Grease 1st crossbred comb.	56s	64	21½
Grease 1st crossbred comb.	56s	64	22
Grease 1st quarter-bred broken	60s	53	18½
Grease 1st half-bred broken	56s	60	21

The above are record prices, evidently paid by firms which must have the wools regardless of price. Scoured crossbreds are also selling with equal strength and making the opening advance of about a penny on last sales' prices. The demand for slipes remains satisfactory, and they are some times ½d. above last week. Crossbred buyers are still prepared to put money into them, and there is a belief that they will be wanted to meet new orders for the British Government for the ordinary tunic serge.

WHERE IS ALL THE WOOL GOING?

Why there is to-day such a great demand for wool is a question well worth looking at in a serious sense. Many men are wondering where all the money is coming from to lift the southern clip. The majority may be under-estimating the amount of wool which it is taking to satisfy the demands on the khaki orders which are everywhere met with. One must not overlook the fact that there are in the field to-day at least fifteen million men, all of whom have to be clothed in well made fabrics. Take for example the recent Russian khaki order, about 6,000,000 yards being placed in the West Riding alone. That is produced from solid worsted yarns, which means that the 26 oz. cloth is composed of pure wool. At Batley, Dewsbury and the numerous large manufacturing villages in that district, the natural home of the shoddy trade, huge weights of fabrics have been turned out weekly, though formerly the firms there seldom bought a bale of pure wool. The war has completely changed such a state of affairs, and in the heavy woolen district, more wool has gone into consumption daily since the war began than many firms consumed in a year in normal times. There is evidence of this in the way firms have bought in Coleman Street, as well as from Bradford and Huddersfield merchants. The huge consumption of pure wool in the multitude of fabrics, all required for the army, in no sense subsides. The British Government during the past ten days has placed good orders for heavy overcoatings.

LICENSES FORTHCOMING

Last week it was stated in this column that the War Trade Department had been rather slow in granting export licenses, particularly to America, but during the week some amends have been made on that score, the result being that business with the United States has again assumed considerable proportions. American buyers have bought more freely in Coleman Street, and Bradford export houses have done a good business. When firms receive a license to ship 1,000,000 pounds there can be nothing much wrong. It is useless to try to escape the machinery established between the British Government and the Textile Alliance. A further important step has been taken and American firms are now being granted the privilege to export to France, Italy and Russia, as well as Japan, through the office of the Textile Alliance.

Closely allied with the above is a question raised during the past day or two in a pointed way, concerning the re-imposition of the embargo. The matter is serious. Everybody has been more or less non-plussed with the activity of American buyers in selling centers down under, and everybody is asking what it means. There has been a round table conference between the War Trade Department, War Office, and one or two members of the trade, whom the government has consulted almost weekly, and it apparently is understood that America is buying with the view of being ready to take full advantage of the world's trade when the war finishes. No one objects to that. It is the question of America and Germany together, and particularly of those across the Atlantic, who have German sympathies.

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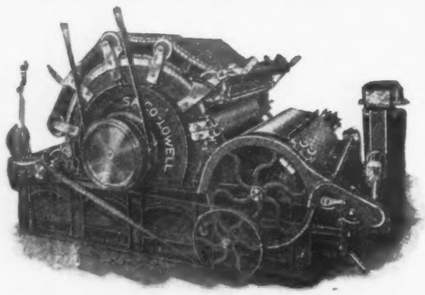

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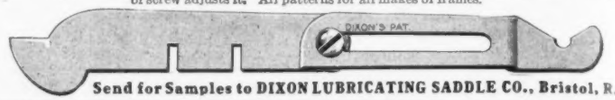

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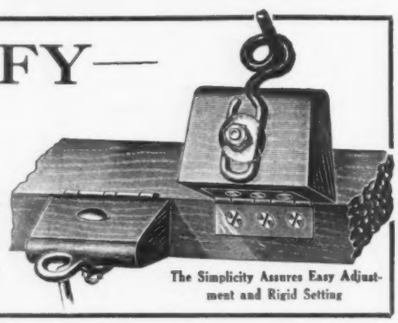

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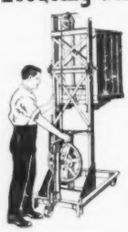

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MISCELLANEOUS MARKETS ARE BEST IN EXPORT FIELD

Small Orders from China Not Indicative of Improvement—South America and West Indies Active

No startling developments have been noted in the export trade during the week. The Far East remains dormant. There has been a cessation of war orders over the holidays, but it is reported that foreign agents are now inquiring for further supplies of duck. The miscellaneous trade continues to hold the chief attention of exporters, and top prices are being paid by them for goods. The increased submarine activity in the Mediterranean by the Teutonic allies is a discouraging feature for the eastern trade, and shipping conditions are slow in recuperating; in fact, they may even be said to have suffered a relapse. Cuba and Porto Rico are in a flourishing condition, and South America, as a whole, is steadily improving.

FUTURE OF EAST UNCERTAIN

Rumors of a resumption of orders from China have been numerous, but a careful investigation finds the orders referred to to be insignificant, and little cause for optimism to those who have enjoyed an extensive trade in the past. The prospect for improvement in the immediate future is slight, as the fundamental causes for the present deadlock are unlikely to be eliminated. A recent communication from Shanghai quotes 48-square 3-yard sheetings at a cent a yard below the estimated cost of American goods laid down in that market, based on present values here. The same ratio holds good throughout the list of heavy sheetings and all similar weight brown goods. Such competition is difficult to overcome, and the situation is not being improved by the advancing market here, by the increased activity of submarine warfare in the Mediterranean, or by freight and insurance rates which are still on the upward trend. The inactivity of brown goods in China is somewhat balanced by brighter prospects in bleached and fancy lines for there is new business being placed in special constructions of print cloths and fine bleached goods, by commission houses that are dealing directly with their agents in China.

Nothing new has developed in the Red Sea or Indian markets. Exports to these districts are practically at a standstill with little hope for improvement in the near future. Quantities of goods purchased at the low prices that prevailed a few months ago are still held up because of difficulty in shipping or payments. There have been cancelations of goods purchased at prices several cents below those obtained when the goods were resold in the eastern market. From this it would appear that new business at present prices cannot be hoped for.

MISCELLANEOUS TRADE GOOD

The miscellaneous trade continues to improve as American goods are establishing a favorable reputation, and few lines are being offered by England and Germany. Exports to South America have been of such great variety that it is not fair to give preference to any one line. Nearly every description of bleached and printed goods have been included in the week's orders. Argentina and Colombia have been large buyers of cotton yarn in 8s to 12s, and of hosiery. Conditions in the Philippines continue unchanged. The dearth of money due to crop failures, and an overexpansion in trade last year when too great stocks were taken, has placed that market in a weak financial position. One large exporter has recently resold 3-yard sheetings for 7½c. that were being held for Philippine shipment at 5¼c., but the order had been canceled. Porto Rico and Cuba have been in the market for large quantities of merchandise.

CHANGE IN MILL HOURS

South Carolina Manufacturers Oppose Ruling on Running Time

With regard to a change in the running time of cotton mills in South Carolina as required by the State Commissioner, Capt. Ellison A. Smyth, of the Pelzer (S. C.) Mills, and president of the Cotton Manufacturers Association of South Carolina, is quoted as follows:

"There are 77,894 automatic looms in South Carolina cotton mills, more in proportion to the spinning capacity of the mills than in any other state in the Union. These looms represent an investment of seven million dollars above the cost of the common looms and were purchased for the purpose of running the automatic looms during the noon hour when the other departments of the mill were shut down, thus gaining an hour's extra production of cloth.

"The executive committee of the association met a few days ago to consider the proclamation of Commissioner Watson and his threat to have arrests made and proceedings instituted against any corporation or individual found running machinery over 60 hours per week where cotton mill employes might be allowed or induced to work longer than 60 hours weekly. While the committee were advised by prominent counsel that the State law prohibiting employment of men longer than 60 hours per week was unconstitutional, and that the state had no right to interfere with the right of contract on the part of grown men, the right to control the hours that women or minors should work was admitted, and they were further advised that the State Legislature could not constitutionally forbid the running of automatic machinery more than 60 hours per week, yet to avoid the vexations and annoying suits and arrests that were threatened by the commissioner, the committee deemed it wise to advise the members of the association, operating more than four million spindles, to discontinue the noon hour run of any machinery in their mills until they were further advised by the committee, and in the meantime steps would be taken to have the Supreme Court rule on the opinion and construction of the law as made by the attorney general and the Commissioner of Labor."

Comparative Quotations.

	Jan. 6.	Last year.
Spot cotton:		
Midland uplands, N. Y.	12.45c.	8.00c.
Print cloths.		
28-in., 64x60, 7.30 yd..	3½c.	2¾c.
Gray goods:		
38½-in., 64x60, 5.35 yd.	4¾c.	3¾c.
39-in., 68x72, 4.75 yd.	5¼-5¾c.	4¼c.
39-in., 72x76, 4.25 yd..	6-6¼c.	5c.
39-in., 80x80, 4 yd....	6⅝c.	5⅝c.
Brown sheetings:		
36-in., 56x60, 4 yd....	6c.	4¼-4¼c.
36-in., 48x48, 3 yd....	7¼c.	5⅝c.
Denims, 9-oz., Amc. dye, value	15½c.	13½-17c.
Ticking, 8-oz.	13½c.	12½c.
Standard prints...value	6c.	4½c.
Stand. staple ginghams.	6¾c.	6¼c.
Drills, 37-in., 3 yd.....	7½c.	5⅝c.

COTTON GOODS STIFFEN ON SLIGHT ENCOURAGEMENT

Combed Yarn Gray Goods in Demand At High Prices—Colored Goods Still Rising

The cotton goods market has been exceptionally strong for this season of the year, and although buyers have been engaged in stock taking they have at the same time been forced to enter the market for more goods. Prices have held firm in nearly every branch of the trade, and although few exceptionally large orders have been taken, top prices have been readily obtained. Mills are not anxious to take on extensive contract business for delivery later than January and Feburary as they believe prices will be advanced to a considerably higher level. Combed yarn goods of nearly all constructions are firm, it is difficult to get deliveries, and prices are advancing out of reach of many converters.

Mills equipped with dobbie looms have little difficulty in disposing of their product at high prices because of the demand for fabrics that can be finished in novelty effects without the use of dyestuffs. Export orders to the miscellaneous markets, although not for large quantities, have been numerous, and have included many lines of bleached and colored goods.

FINE GOODS WELL PLACED

Fine gray goods prices have been exceptionally firm, with a keen demand on a well-sold-up market. Thirty-inch, 88 x 80s, have advanced to 6¼c., 40-inch, 76 x 72s, sold at 7¼c., and 88 x 80s at 8¼c. The demand has been active for combed goods of nearly all constructions, but satisfactory deliveries are difficult to secure. Organdies have been a feature during the week, with sales of 40-inch 72 x 64s, 13s yarn, a favorite at 7¾c. There were also good sales of 40-inch 80 squares 13s yarn. Voiles have been strong, with 40-inch, 60 x 56s, lawn twist, sold at 7¼ to 7½c. The demand for poplins continues to be good, and recent sales of 28-inch 96 x 40s, 5-yard, 2-ply warp and single filling combed goods have been made at 10½c. There has been a large business reported for middy blouse materials at an average price of 8¾c. Gabardines are active, and mills are well sold ahead. Combinations of cotton and silk are in demand, and high prices are being obtained for these goods. Orders for sateens are better than normal, and in view of the shortage of dyestuffs, this is gratifying to manufacturers. Orders on 35-inch Alberts have been placed in considerable quantities by clothiers for linings. The increased demand is due to the high prices of dress goods, and the need of cheapening garments by the use of a light-weight woolen cloth balanced to the former weight by the use of more lining.

TOP PRICES FOR SHEETINGS

Sheetings have been exceptionally firm. The volume of business during the early part of the week was not as large as some commission-house men had anticipated, but top prices were obtained for all goods that were sold. Orders ran into bigger yardage toward the last of the week, and a quantity of 40-inch goods were sold, 2-50s and 2-85s being the most desired. The latter sold freely at 8¼c. The shortage of burlaps has, to some extent, forced bag manufacturers to take cotton goods, as a substitute, for immediate use, a condition which has strengthened the market on goods suitable for this purpose. Wide sheetings are well sold ahead, and it is difficult for sheet manufacturers to obtain goods to fill the orders they have in hand.

COLORED GOODS RISING

The finished goods market is at the mercy of the dyestuff situation. Many manufacturers of ginghams are holding their lines at value, and it is not unlikely that some of the largest factors will withdraw from the market. Nine-ounce denims are quoted at 15¼c., but this is for American dyes that are not guaranteed fast, while indigos have advanced to a far greater extent. Announcement has been made during the week of advances in American and Pilgrim prints; Berkshire robes; American twill draperies; Sentry, Ledford and Scout percales; American, Majestic and Rumson cambrics.

An important line of tickings was placed at value on Wednesday. Bleached goods have advanced in price, but not as much as gray goods. The bleacheries have been through several lean years, but as conditions have improved they may be expected to become more independent and advance prices. The duck market is firm, and mills are experiencing little difficulty in obtaining export orders for the product not required by the domestic trade. Mills are sold far ahead and large orders are going begging for lack of looms.

COTTON GOODS TRADE NOTES

Charles Cromwell, for many years manager of the cotton goods and burlap departments of Marshall Field & Co., retired from business Dec. 31, 1915.

The partnership hitherto existing between John W. T. Nichols, Thomas W. Slocum, L. William Horr and George Nichols in Minot, Hooper & Co., expired by limitation Dec. 31, 1915. The business will be continued by the same four partners with Robert Newell and George Linton in addition admitted to the partnership.

Henry Searing, who has styled the Newmarket Mills for Louis Seigbert & Bro. for several years, has entered the dry goods commission business at 72 Leonard Street, and has been appointed selling agent for the Nockege mills, of Fitchburg, Mass.

The New York office of the Passaic Print Works will be removed from 19 Thomas Street, on Jan. 15, to 320 Broadway.

Irving C. Smith has resigned as president of the Athenia Textile Co., and has become associated with J. W. Goddard & Sons, Inc., in charge of the converting and white weave departments.

Charles H. Kenaston, who two years ago left the H. B. Claflin Co., where he had been a general salesmen for many years to become the general manager of the Reciprocal Jobbers, Inc., has returned to the H. B. Claflin Corporation. Mr. Kenaston will cover Ohio, Indiana, Iillinois and Michigan.

A. P. Geewehr, who has been representing the firm of Deering, Milliken & Co. in Chicago, has been recalled to the New York office.

The H. B. Claflin Corporation has made extensive improvements in its sheet and pillow case department. Additional space has been given this department, and many fancy patterns have

COTTON MANUFACTURES—Continued

been added to the regular lines. Particular energy is being extended to push this department by Mr. Donahoe, who will be in charge. Mr. Kepple, the president of the Defender Mfg. Co., will supervise the styling of the department and the manufacture, and will be in daily touch with the selling organization. Additional salesmen added to the force include Messrs. Sharp, Aubushun, Ressenger, Oltman, and Lenox.

The Amoskeag Manufacturing Co., Jarvis & Prankard, selling agents, has placed all tickings at value.

Converse & Company have leased four lofts at 91 Bleecker Street, corner of Mercer, for warehouse purposes and to facilitate deliveries.

F. S. Richardson and P. A. Baldwin have sent the following notice to the trade: "We beg to announce that beginning Jan. 1, 1916, we will conduct a cotton goods brokerage business at 43 Leonard Street, Rooms 102 and 103, under the firm name of Richardson & Baldwin (a co-partnership)."

The Corn Products Refining Co., large manufacturer of starches, dextrines, etc., has made the following interesting announcement to its customers under date of Jan. 1. "We are desirous of obtaining all the good empty starch bags possible, and to this end we shall offer our patrons, from time to time, the best possible prices (freight prepaid to our factory) on such bags as we ship to them. Bags are valuable, and if properly stored after the contents have been emptied are returnable to us, if in good condition, and a good price will be paid for same."

TARIFF AND PROSPERITY

(*Continued from page* 11)

sense is meant, but in a specific sense, for editors are human and it is perhaps too much to expect to find omniscience enthroned within the cloistered confines of the editorial sanctum.

"Were the *Enquirer* as familiar with the facts of business as it undoubtedly is with the ramifications and verities of journalism it is not too much, nor too flattering, to say that the *Enquirer* would agree with President Francis' statement, in his address to the members of the American Association of Woolen and Worsted Manufacturers, that the Underwood Tariff law does not give adequate protection to the woolen industry. It would, likewise, know why the quoted New York publication was correct in stating that the woolen industry of the United States is now prosperous.

"And so, instead of finding in these two seemingly conflicting statements provocation for journalistic thunderbolts, the *Enquirer* would, or might, applaud.

"Anyway, if the assimilation of truth, peradventure, proved in the language of Artemus Ward, 2, 2 mutch for antagonistic economic opinion, the *Enquirer* might, at least, have maintained a patriotic and becoming silence.

"President Francis was sounding a warning for industrial preparedness just as the nation, in time of peace, is being warned of the importance of naval and military preparedness.

"The present prosperity of the woolen industry is entirely due to the European war; directly, because importations of wool manufactures from Germany, Austria, France, Belgium and England have practically ceased, and indirectly, because tremendous war orders in other lines have vastly increased employment and this, in turn, has greatly increased the purchasing power of our people and has spread prosperity in all directions.

"The European war is doing for America what a protective tariff would do were all the warring nations at peace.

"The idle mills and countless unemployed during the period preceding the outbreak of hostilities abroad furnished abundant testimony to the inadequacy of the Underwood law.

"What will happen when the millions of men now fighting again return to peaceful pursuits? What the effect on foreign wages when the labor markets of the warring nations are suddenly flooded with this vast horde of men seeking work?

"Unless this nation builds up a tariff wall sufficiently high while this frightful European war is raging, there will be a foreign industrial invasion of our markets after the war is over that will be without a parallel.

"It is, perhaps, vain to hope to convince the *Enquirer* of the error of its allegation that 'the consumers pay the duties levied under all tariff laws, high or low,' but it may be worth while to state a few facts for the benefit of open-minded readers should the *Enquirer's* neutrality permit it to publish this editorial criticism.

"Under a thoroughly protective tariff, the consumer pays for protected American-made commodities as much more than he would have to pay for identical foreign commodities, as the labor cost of everything that comprises the cost of home-made products exceeds the labor cost of foreign products.

"That higher price is the unfelt contribution all purchasers in America mutually make for the maintenance of the American standard of wages and living.

"The selling price of wool manufactures, like the selling price of all other productions, protected or not, is limited, by the immutable laws of competition and supply and demand, to a reasonable profit above cost.

"If an import duty be higher than the exact measure of the difference in cost of production, here and abroad, the excess beyond a reasonable profit cannot be added to the selling price without inviting competition that will be destructive of all profits.

"What a protective tariff does, and all it does, is to safeguard the home market against an invasion of foreign products.

"These are the facts of business, authenticated by everyday experience of practical men, and no amount of journalistic guesswork or academic theory of rocking-chair economics can alter their truth.

"Ex-President Taft's public statement, quoted by the *Enquirer* (what colossally convenient memories these free traders have!) that the woolen schedule of the Dingley tariff was indefensible, only proved that he, too, lacked omniscience.

"Having no personal acquaintance with the intricacies of the woolen business, he became the trusting victim of those whose knowledge was in inverse ratio to their vindictiveness toward the worsted manufacturers. That is history.

"The *Enquirer* makes the unqualified assertion that the American Association of Woolen and Worsted Manufacturers 'is not popular with the farmer who produces the wool.' Why this libel upon the intelligence of the farmer?

"Inasmuch as the activities of the Association are confined exclusively to the betterment of trade conditions and the correction of trade abuses, the unwarranted flings of the *Enquirer* make it palpably evident that its closing reminder that 'Fair play is a jewel' is not intended for home consumption."

GEO. C. HETZEL.

L. F. DOMMERICH & CO.

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COTTON MILL NEWS

*EASTHAMPTON, MASS. The West Boylston Manufacturing Co. confirms recent report to the effect that a new spinning and twisting mill is to be erected. This building will be 120 x 640 feet, three stories high; there will also probably be built one or two cotton warehouses and a number of operatives' houses. The capital stock of the company will be increased from $1,000,000 to $2,000,000, the new stock being issued for cash. Exact details of machinery equipment have not yet been fully determined.

*DANIELSON, CONN. The No. 2 mill of the Connecticut Mills Co., Inc., will be extended from its present size of approximately 250 feet to 300 feet, and another story will be added, making the mill three stories over all. Additional machinery to be installed has been contracted for.

WILLIMANTIC, CONN. The American Thread Company has decided to abandon the manufacture of wood pulp spools at its local No. 3 mill, it is reported. The No. 3 mill, it is expected, will gradually be equipped with machinery for the manufacture of thread.

FINANCIAL MARKETS—MILL SHARES AND STATEMENTS

MILL SHARES STILL ACTIVE

Large Sales of Pacific and Much Interest Shown in New Issue

BOSTON, Jan. 5.—Interest of investors in mill shares has been largely concentrated upon a few issues like Pacific, Arlington, and American Woolen preferred, and upon the several new stock issues that have come on to the market recently. Demand for Pacific has been particularly broad, both at private and public sale at prices ranging from 125 to 126; 275 shares were sold at to-day's auctions, starting at 125⅜ and closing at 126, a majority of the sales being made at the latter figure. The excellent business that is now being done by the Pacific and its strong financial position are the factors primarily responsible for increased interest in this stock, but demand has undoubtedly been accentuated by rumors of a possible increase in the dividend rate some time this year. Arlington touched a new high-water market in the present upward movement by selling at 100⅛, although most of the recent sales have been made at par. Attention was directed to the Nashua-Jackson merger by the sale of three and one-half shares of the former at to-day's auctions at 750, an advance of 40 points. This merger is now an accomplished fact, but the question of whether it will involve refinancing of the Nashua company has not been made public. It is a notable fact that every sale made at to-day's auctions scored an advance, although in a few instances these advances were fractional.

BOSTON STOCK AUCTIONS

The sales of textile shares at the Boston auctions on Wednesday were as follows:

Shrs.	Mill.	Par.	Sales.	Chge.
26	Arlington	100	100⅛	+⅛
15	Bigelow-Hartf'd cm.	100	84	+4½
10	U. S. Worsted 1st pf.	100	60¾	+5¾
3½	Nashua	500	750	+40
5	Wamsutta	100	123⅛	+5⅝
100	Pacific	100	125⅝	+⅝
175	Pacific	100	126	+1
10	Gt. Falls	100	191	+3½

354½ Total.

FINANCIAL NOTES

The Hamilton Woolen Company, Southbridge, Mass., has declared a semi-annual dividend of three per cent. payable Jan. 10 to stock of record Jan. 3.

As noted in these columns last week, the stockholders of the Manomet Mills, cotton yarns, New Bedford, Mass., will meet Jan. 12 to act upon the proposed increase of $1,000,000 in the capital stock and to authorize the construction of an additional mill adjacent to the present plant. The present capital stock is $2,000,000 and the mill operates 126,288 spindles. The company commenced dividend payment at the rate of six per cent. but increased this to eight per cent. in the fall of 1906 and has maintained it without a break since then.

An active demand is reported for the new issue of six per cent. cumulative preferred stock of the Sharp Manufacturing Company, New Bedford, at 102½ and accrued dividend from Jan. 1. The entire issue of $600,000 has been underwritten, thus allowing the company to take immediate advantage of opportunities to place contracts for building materials and equipment at advantageous prices.

The provisions protecting the preferred stock are very strong. The preferred stock is entitled to 6 per cent. cumulative dividends payable January, quarterly, but with the right to share in dividends with the common up to 8 per cent. Until Jan. 1, 1918, the preferred stockholders may convert their stock into common shares in the ratio of six (6) preferred shares for five (5) common shares. The preferred is callable at $120 per share at any time upon thirty days' published or written notice from the company. In case of liquidation, the preferred stock is entitled to full payment before anything is disbursed on the common stock. No mortgage can be placed upon the company's property, except by vote of 75 per cent. of the outstanding preferred stock. The preferred stock has equal voting power with the common.

NASHUA-JACKSON MERGER

After nearly five years of litigation all law suits preventing the merging of the Nashua Manufacturing Co. and the Jackson Co., Nashua, N. H., have been dismissed and the actual merging was accomplished last Tuesday, when deeds transferring the real estate of the Jackson Co. to the Nashua Co. were recorded. A new suit started last month by minority stockholders of the Jackson Co. still remains undecided, although United States Court refused to grant them a preliminary injunction to restrain the consolidation. At the annual meeting of the Nashua Manufacturing Co. last week the old board of directors and officers were re-elected. With two exceptions the directors and officers of the two companies are identical and Amory, Browne & Co., handle the product of both companies.

New England Mill Stocks.

Note.—Quotations not marked * represent sales prior to July 31, 1914.

	Par.	Sale. Latest.	Sale. Previous.
Aetna	$100	‡100	..
Am. Woolen pf.	100	*94¾	*94¾
Amoskeag	100	*66	*66
Amoskeag pf.	100	101½	100¼
Androscoggin	100	*160	*160
Appleton	100	172	171
Arlington	100	*100⅛	*100
Bates	100	*240	*240
Bigelow-Hartford pf.	100	*107¼	*107¾
Borden, Richard	100	120	120
Boott Mills	100	*80	*75
Boston Mfg. Co.	100	105¼	105¼
Boston Duck	700	1280	1252½
Brookside Mills	100	113⅜	110
Cabot Mfg. Co.	100	100	120
Chicopee	100	*60	*65
Columbian	1000	‡1012½	..
Continental	100	75¼	75
Draper	100	230	230
Dwight	500	*1000	*1033
Edwards	100	$99	98½
Esmond pf.	100	95½	92½
Everett	100	*120	*118
Franklin	100	*201½	*200
Great Falls	100	*191	*187½
Hamilton Woolen	100	*80	*95
Hamilton Cotton	100	*75¼	*70¼
Hill	100	*85	*90¼
Jackson	1000	890	985
Lancaster	100	*79	*77¼
Lawrence	100	*165¾	*150
Lockwood	100	*98¼	98½
Lowell Bleachery	100	*127½	126½
Lowell Hosiery	100	40	..
Lyman	100	*122½	*124¾
Massachusetts	100	*133¼	*130¾
Mass. Mills in Ga.	100	*99	*99
Merrimack pf.	100	*83	*85
Merrimack com.	100	*33	*35
Middlesex	100	*55	*56
Monadnock Mills	1000	‡1000	..
Nashua	500	*750	*710
Naumkeag	100	*185	*182½
N. E. Cot. Yn. com.	100	20	20
N. E. Cot. Yn. pf.	100	*51	*35
Newmarket	100	*95¼	*95
Otis	100	*2835	*1852½
Pacific	100	*126	*125
Pepperell	100	*345	*345
Pepperell (new)	100	*120¾	*121
Pemberton	100	*80	*85
Plymouth Cordage	100	*195½	*194⅞
Salmon Falls M. Co.	100	*23½	*26
Shaw Stocking Co.	100	*50½	75
Thorndike	1000	*1370	*1305
Tremont and Suffolk.	100	*112	*107
Winthrop	100	100	100¼
Waltham B. & D.	100	*100¼	140
York Mfg. Co.	100	*95¼	*94½

‡ Old quotations that are considered at variance with recent figures at private sale.

New Bedford Quotations.

(By Sanford & Kelley, New Bedford, Mass.)

	Bid.	Asked.
Acushnet Mills	167½	..
Beacon Mfg. Co.	102	..
Beacon Mfg. Co. pf.	114	..
Booth Mfg. Co. com.	30	..
Booth Mfg. Co. pf.	95	..
Bristol Mfg. Co.	90	..
Butler Mfg. Co. com.	..	90
Butler Mfg. Co., pf.	..	107
City Mfg. Co.	100	..
Dartmouth Mfg. Co. com.	..	200
Dartmouth Mfg. Co. pf.	100	..
Gosnold Mills pf.	91	..
Grinnell Mfg. Co.	130	..
Hathaway Mfg. Co.	200	..
Holmes Mfg. Co.	160	..
Holmes Mfg. Co. pf.	114	..
Kilburn Mills	135	..
Manomet Mills	..	130
Nashawena Mills	93	..
Neild Mfg. Co.	118	..
N. B. Cotton Mills Corp.	100	..
N. B. Cotton Mills Corp. pf.	..	95
Nonquitt Spinning Co.	..	102½
Page Mfg. Co.	80	..
Pierce Mfg. Co.	..	410
Pierce Bros., Ltd.	100	..
Potomska Mills	130	..
Quissett Mills com.	138	..
Quissett Mills pf.	114	..
Sharp Mfg. Co.	..	106
Sharp Mfg. Co. pf.	..	106
Soule Mills	92½	..
Taber Mills	119	..
Wamsutta Mills	119	..
Whitman Mills	161	..

Southern Mill Securities.

(By Morton Lachenbruch & Co., New York.)

	Bid.	Asked.
American Spinning Co. com.	150	..
American Spinning Co. pf.	100	..
Anderson Cotton Mills	..	13
Arkwright Mills, S. C.	85	110
Bibb Mfg. Co. com.	145	157
Bibb Mfg. Co. pf.	95	105
Brandon Mills	..	53
Brookside Mills	135	170
Cannon	150	..
Carbarrus	140	..
Cliffside	195	..
Clifton Mills	80	90
Columbus Mfg. Co.	..	..
Courtaney Mfg. Co., S. C.	50	60
Drayton Mills com.	..	20
Drayton Mills pf.	..	90
Darlington	..	70
Eagle & Phoenix Mills	..	60
Exposition Cotton Mills	110	125
Florence	..	136
Fulton Bag & Cotton	..	..
Gaffney Mfg. Co.	50	..
Gainesville Cotton Mills, Ga.	..	..
Gate City Cotton	..	..
Glenn Lowry pf.	..	75
Glenwood	..	..
Grandet Mills	..	90
Grendet Cotton Mills	90	100
Henrietta Mills	..	125
Highland Park	175	200
Highland Park pf.	100	..
Hartaville	..	..
Inman Mills	..	95
Judson Mills, S. C.	20	50
Kesler	145	..
Lanett Cotton Mills	102	..
Laurens Mills	90	100
Lockhart Mills, S. C., com.	33	40
Lockhart Mills, S. C. pf.	..	90
Loray Mills pf.	..	35
Manchester Cotton Mills, Ga.	120	140
Manchester Cotton Mills, S.C.	..	105
Monarch Cotton Mills	103	105
Ninety-six	*130	..
Pacolet Mfg. Co. com.	98½	..
Pacolet Mfg. Co. 1st pf.	93	98½
Parker Mills com.	½	1½
Parker Mills pf.	2½	5
Patterson	130	..
Pelzer Mfg. Co.	90	105
Piedmont Mfg. Co.	120	160
Pell City	..	..
Pickens Cotton Mills	75	105
Salisbury	..	..
Spartan Mills	109	112
Toxoway	..	..
Union Buffalo Cotton Mills, S. C.	..	..
Union Buffalo Cotton Mills, S. C., pf.	30	35
West Point Mfg.	113	..
Whitney	..	..
Woodside Cotton Mills	23	30
Young, Hartsell	..	..
Warren Mfg. Co.	..	80
Warren Mfg. Co. pf.	..	97½

* Ex-dividend.

TARIFF AND THE WAR

(*Continued from page 22*)

sally used dyestuffs, aniline black, for which a fair price two years ago was 20c per pound. One of our manufacturers has contracted for delivery of this material, to be made in this country, to be delivered after March next at 80c per pound, which is the lowest current quotation. What chance would such an industry have if the normal price of 20c was resumed after the war?

Greatly exaggerated statements have been made, many of them, unfortunately, by United States officials, as to the rapid growth and favorable prospects of the dyestuff industry in this country, but the fact remains that this industry will not stand for one day when the foreign products again appear in this market without an adequate and greatly increased measure of protection.

The same applies to the manufacture of woolen cloth. I instance fabrics A and B, inclosed, which, while having the appearance of Scotch cheviots, are largely composed of cotton, ingeniously manipulated and on which the labor cost bears an unusual proportion to the value of the finished product. Owing to the low labor cost in England these fabrics were being largely imported before the war broke out, and they are still being made at lower prices in England, and the tariff of 35c under the Underwood law is absolutely inadequate to protect the industry here. On dissection any expert will verify the statement that these goods cannot be made here at a price to compete with the foreign goods, freight and duty paid.

Another consideration which is being brought up to cloud the issue is that the foreign manufacturers would take years to recover from the results of the war, and that we need not fear their rivalry for some time to come. The fact is that in both England and Germany much of the textile machinery, formerly operated by men, is now being run by women workers, who, in many of the departments, especially in the spinning and weaving, can take the place at even lower wages. This competition, as well as other changes caused by the necessities of war, will no doubt remain and be a considerable factor when the war is over. The machinery for producing these fabrics is absolutely intact in both England and Germany, and also in Austria, and will be in position promptly to resume export business shortly after the declaration of peace.

This also, I understand, applies to the great dyestuff industry in which Germany has so long led the world.

These facts, it seems to me, should be clearly placed before the Congress, and the American people, that the issue involved be made clear, and the responsibility for the protection of our industries, or the lack of it, be placed where it belongs. Very truly yours,

JOSEPH D. HOLMES.

MILL STATEMENTS

Name and address of company.	Line of business.	Fiscal year.	Cash and debts receivable.	Raw materials, mdse., etc.	Total quick assets.	Assets: Real estate, bldgs. and machinery.	Assets: Miscellaneous. Amount.	Assets: Miscellaneous. Description.	Assets: Total.	Liabilities: Acc'ts payable, floating and funded debt.	Liabilities: Capital stock.	Surplus, profit and loss, etc.
N. E. Cotton Yarn Co., New Bedford, Mass.	Cotton	1915. Sept. 25	$2,488,549	$1,875,027	$4,363,576	$8,411,351	$1,418,251	Inv'ts., impv'ts., etc.	$14,193,278	$6,610,696	$5,900,000	[3]$1,682,582
	"	1914. Sept. 26	1,705,025	1,736,216	3,441,241	8,411,351	1,366,085	Inv'ts., impv'ts., etc.	13,218,678	5,862,685	5,900,000	[4]1,455,993
Columbian Mfg. Co., Greenville, N. H.	"	1915. Oct. 1	239,652	161,206	400,858	235,498	.....	.....	636,356	5,644	350,000	[2]280,712
	"	1914. Oct. 1	266,353	95,573	361,926	197,707	.....	.....	559,633	3,337	350,000	206,296
Otis Company, Three Rivers, Mass.	"	1915. Oct. 1	32,566	1,035,773	1,068,339	1,019,821	.....	.....	2,088,160	253,400	800,000	[1]1,034,760
	"	1914. Oct. 1	12,234	1,229,019	1,241,253	970,022	.....	.....	2,211,275	549,331	800,000	861,944

[1] Includes reserves-depreciation, $498,020; cotton insurance, $10,000; sinking fund, $67.
[2] Includes depreciation, $33,345.
[3] Includes depreciation, $109,968.
[4] Includes reserves-depreciation, $498,020; cotton insurance, $10,000; sinking fund, $66.

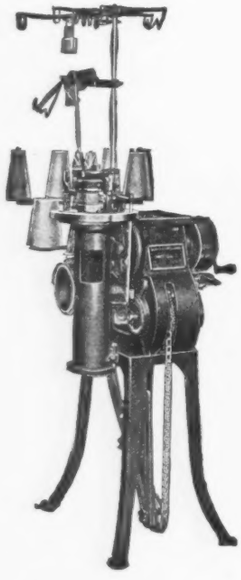
The Attention of all Manufacturers of

WOMEN'S HOSE

is invited to our new

FASHIONED WELT MACHINE

MODEL K



This machine produces women's hose with an **inturned knitted welt** similar to that produced on full fashioned machines. The machine has all the features of our other models—each stocking being dropped from the machine complete, except for the looping of the toe. It is fitted with five yarn changing fingers, inserts an "anti-run-back" course, and, the welt being knitted on the machine, has all the elasticity of the fabric and may be made as wide as desired.

Write for samples and further information

Established 1865

SCOTT & WILLIAMS, Inc.

88 Pearl Street

Boston

New York
366 Broadway

Utica
5 Blandina Street

Raw Materials, pages 43, 44, 45

Knit Goods

Hosiery—Underwear—Sweaters—Fancy Goods

Yarn Markets, pages 36-38, 47-48

HOSIERY SCARCE WITH MANY DELAYED DELIVERIES

Visiting Buyers Will Have Opportunity to Correct Their Hazy Views on Dyestuffs Scarcity

One of the good results of the visit of out-of-town jobbers to New York will be a broader dissemination of more correct ideas on the exact status of the hosiery manufacturer on the matter of dyestuffs. It is hard to believe that jobbers are not already thoroughly informed on the dyestuffs situation, but selling agents still believe that buyers draw erroneous conclusions from what they know. From experience jobbers are learning that merchandise is scarce but mill agents believe that more cooperation could be secured if they appreciated properly the difficulties under which manufacturers are operating today. Mills which have been turning out the best merchandise they can, which has, however, not been up to standard, find that jobbers are judging merchandise by the same standards that they used when dyestuff conditions were normal. Manufacturers believe that this is unfair and that a little leniency on their part would smooth out the business relations of both. There is improvement of late in the general finish of goods because no further experiments are being made with logwood on hosiery for which it is not suited, and more satisfactory results are being obtained by the use of aniline oil in oxidized blacks than when first adopted.

SCARCITY BECOMING ACUTE

Selling agents look forward to the spring as likely to be a period of scarcity in many descriptions of hosiery such as has not been witnessed for many years. Indications that supply is even now falling behind demand are to be found in the fact that deliveries from many mills are delayed and that large stocks are being held in the gray inasmuch as finishing plants cannot keep up with the demands being made upon them. There is also the fact that immense quantities of hosiery are being taken for export and as these goods are going out of the country the production which they represent is placed completely beyond the reach of the home trade. The impending scarcity is therefore not wholly a question of dyestuffs, but rather one of growing demand with insufficient supply to meet it. Jobbers are glad to take in merchandise no matter how much delayed it may be from scheduled deliveries and none shows any inclination to cancel. It is a situation of great strength for the seller and what advances within reason he sees fit to make are supported.

MIXED SITUATION FOR FALL

One mill agent reports that his line of merino hosiery, opened a number of weeks ago for next fall at an advance of 10c. from last year, has been sold up. Other lines opened at the same time have met with active buying and mills which have so benefited can plan out their work ahead with confidence if they have also covered themselves on their raw material. Certain woolen and cashmere lines are not being sold so far ahead because of the bullish attitude their manufacturers take on raw wool. Cotton hosiery has not met with much demand for fall as yet and manufacturers are not pushing these lines. They have confidence that jobbers will feel the need for merchandise before they feel the need for additional orders. For spring, however, nearly all lines are in good condition and orders already received are large. Sellers feel that some jobbers are going to be short of goods and it is a case of first come, first served.

HOSIERY TRADE NOTES

A fire in the plant of William F. Taubel, Inc., at Riverside, N. J., last Sunday destroyed part of the finishing department, with a reported loss of $300,000. The origin of the fire is not known. Arrangements have been made to continue the work of this department in other buildings of the plant.

Last Wednesday ten of the eastern salesmen of the American Hosiery Co. arrived at New Britain, Conn., for their annual visit to the plant, and were entertained at the Hartford Club by Edward H. Davison, president of the company. The company plans to add several new men to its force of travelers.

Hosiery agents who have been complaining of the attitude of buyers through a large part of 1914 and 1915 are pleased to see the market gaining such a position that they can now dictate to buyers. It is many months since they have had this opportunity, and they believe that it may teach buyers a lesson.

Many late deliveries are now being made, and jobbers who are trying to place reorders on desirable grades are finding that few cases are available before March.

Many jobbers are interested in the artificial silk situation, and there is belief on the market that a large part of the goods sold cannot be delivered.

KNITTING MILL NEWS

PHILADELPHIA, PA. The Pilot Knitting Mills are to be started up at 233-35 Market Street by H. J. Auerbach & Co. Mr. Auerbach until recently was connected with the firm of Haber & Auerbach. The plant will be equipped with 20 latch needle and 15 sewing machines, to be operated on men's, women's, and children's sweater coats, the production to be sold through J. H. Woodward, Bourse Building, Philadelphia, and Jas. E. Malone, New York.

JELLICO, TENN. Diamond Hosiery Mill, with capitalization of $75,000, has been organized by G. T. Whitlock, and he will be the manager of the enterprise. Plans have been secured for the construction of a 100 x 50 foot two-story brick building, in which will be installed an equipment of hosiery knitting machinery.

*SOUTH BEND, IND. The Stephenson Underwear Mills confirm the report that they have increased their capital stock to $1,000,000 to allow for an extension of facilities. Men's and women's flat and ribbed underwear and union suits in cotton, wool, worsted and merino are manufactured with a present equipment of 8 sets of woolen cards, 92 knitting machines, 150 sewing machines, etc.

NEW YORK, N. Y. The Harvard Knitting Mills, manufacturers of sweater coats, are to remove their plant from 519 Broadway to 19-25 East 24th Street, before Jan. 15. A quantity of new knitting and sewing machines will be installed in the new location, increasing the capacity.

UNDERWEAR PRESENTS STRONG AND EVEN FRONT

Visiting Buyers Are Arriving but Market Is Not in Need of Their Operations

The underwear market is beginning the new year in better statistical shape, and with a more optimistic spirit than has been shown for a number of years past at a similar season. It is in marked contrast with conditions ruling this time in 1915. Then orders for fall amounted to almost nothing, and selling agents were willing to make all sorts of concessions to draw buyers out of their shell. The result was a situation completely at the command of jobbers. They did not, however, take much advantage of it, for their initial buying was of only small compass. At present the situation is quite the reverse, with sellers in the seat of power. Underwear of nearly all sorts has been in such good demand as to leave mills in a sold-up position of such strength that they are independent of further demand for some months. This applies equally to mills running on both light and heavy weights. For fall initial orders have been large, and, according to the statement made by several selling agents, a number of mills are virtually sold-up on this part of their product. Light weights are in similar position, with only a comparatively small margin of production left to care for the reorders that may be expected as the distributing season nears.

SERVICE OF JOBBERS' VISIT

Selling agents have at various times in recent years stated their belief that jobbers are coming more and more to do their buying in New York. This has not been borne out by the experience of the last two openings on fall weight garments. Last season, as mentioned above, buying from salesmen who in November took to the road was light, and the jobbers who visited New York in January, 1915, did little or nothing to increase the volume of goods under contract except to place blanket orders in some cases, which agents generally found worthless until confirmation and details began to straggle in during the spring. At the time of confirmation many of these orders were scaled down so that it was well that sellers did not place too much confidence in them. This year the traveling men met eager demand, and, according to agents, almost all the buying they want and can expect was placed on the road. Jobbers' New York visit, therefore, has appeared of little value so far as the actual securing of orders is concerned. It is, however, serviceable in bringing jobbers and agents together, and in bringing one jobber in closer touch with other jobbers for an interchange of ideas.

OPTIMISM PREVAILS

Jobbers have scheduled their annual meeting for next Monday, and during the week many appeared about the market. They are, on the whole, optimistic on trade prospects during the year. The chances seem good for continuance of broad distribution of underwear, and it is believed that unusually small stocks will be carried over from the current heavy-weight season. Deliveries are being taken later than usual, as previously mentioned in this column, but it is believed that this merchandise will also go into consumption. Jobbers have still another reason for accepting these late deliveries, however, which is the fact that the goods are billed at prices lower than replacement cost by 10 to 15 per cent. Cotton ribs show a growing popularity in the large business already placed and fleeces, though not expanding for domestic distribution, have prospect of good export support. Women's underwear is in a better position than usual, largely as a reaction from a year when jobbers were caught short of supplies by misjudging the power of demand.

UNDERWEAR TRADE NOTES

Shipment of underwear from mills on the current heavy-weight season is still being made and jobbers are glad to take in this merchandise.

The week began in quiet fashion, though toward its close the market presented a scene of greater animation because of the arrival of a large number of out-of-town buyers.

The Jobbers' Association of Knit Goods Buyers holds its annual winter meeting at the Waldorf Astoria on Monday, Jan. 10, with two sessions at 10 a. m. and 2 p. m., and a vaudeville-smoker at 8 p. m.

This comes 10 days in advance of the convention of the National Wholesale Dry Goods Association, scheduled for Jan. 20 and 21 at the Waldorf.

Efforts to purchase the machinery of a New York State mill for removal to Savannah for the purpose of starting a fleeced underwear mill there, reported in this column not long ago, are said to have fallen through.

The high cost of labor in the vicinity of the mill's location in New York is said to have made manufacture improfitable. It had been figured that the same machinery could be operated in the South at a profit, but numerous obstacles in the financial arrangements prevented the completion of the project.

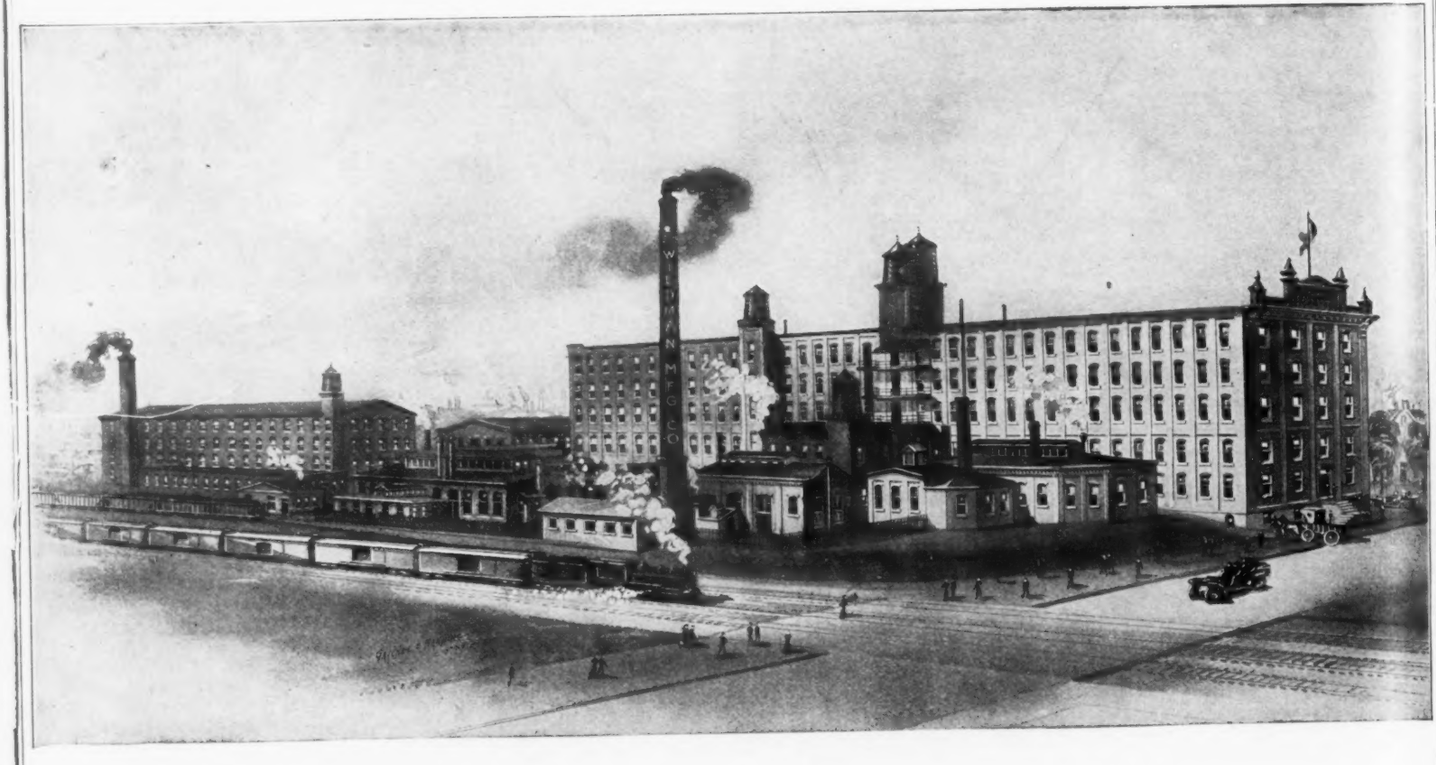
SWEATER COATS UNCHANGED

Passing of Holidays Finds Trade in Same Strong Position

Sweaters, having passed through the usual quiet holiday period, are now awaiting the action of buyers on their annual visit begun this week. There may not be much buying left to be done in many quarters, but from agents' reports the situation in this regard is spotty and accurate generalizing is difficult. The low end coats are perhaps the best sold ahead of any in the market and agents for such lines as cotton sweaters have found trade particularly good. Merino coats have also proved desirable numbers inasmuch as the all-wool shoddy garment has so advanced in price because of the rise in the stock that it is abnormally high in proportion to the quality offered.

Retailers have had fair success in moving out many grades of sweater coats for the holiday trade, and it is believed that the carry-over will not be large. There were rumors on the market last week that $3,000,000 worth of sweater coats, costing about $18 per dozen, were wanted by the Allies. Communication with the office of the bankers through whom such orders pass secured only the information that they held no unplaced orders and no confirmation was to be had among agents.

F. B. WILDMAN
President and Manager



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AUTOMATIC STOP MOTIONS
ELECTRIC CLOTH CUTTERS

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KNIT GOODS—Continued

HOSIERY MAKERS MEET

Philadelphia Producers Protest Against Insurance Rates

The regular monthly meeting of the Philadelphia Hosiery Manufacturers was held Thursday evening, Dec. 30, at the Manufacturers Club, following the usual dinner. The meeting developed into a general discussion of the Compensation Law, and the rates applied to hosiery mills under the requirements of this new statute. It was the general opinion of those present that the rates applied to hosiery mills were excessive as compared with those in other industries, and that protest should be made regarding this. It further developed that while many mills were being quoted a rate of 42c. others had been quoted 36c., while others had a rate as low as 28c. The situation was regarded as decidedly confused and without any definite basis. It appeared that silk hosiery mills were being quoted a rate of 17c., and no reason could be advanced by manufacturers why there should be this difference, inasmuch as the mechanical operations are practically the same. It was decided a committee should draft a protest against these rates of compensation insurance as applied to hosiery mills in Pennsylvania and forward this to Harrisburg. Edward F. Powell, Jos. S. Rambo, and W. Park Moore were appointed on this committee.

The meeting also listened to the resolutions adopted at the recent manufacturers' gathering in Chicago which were approved, although no action was taken on the Tariff Commission subject. A resolution was also adopted putting the meeting on record as favoring the passage of House Bill 702, providing a protective tariff for the domestic dyestuff industry.

The Redfield report on the hosiery industry was discussed in rather a general fashion. It was felt that inasmuch as Mr. Redfield had betrayed such a limited knowledge of actual facts and conditions in the industry, it was not worth while to dignify the matter by taking any action.

One of the developments of the meeting was the fact that the cost of insurance in various mills would necessarily entail added cost for raw materials. The hosiery manufacturer will be obliged to help carry this burden, which will add to the cost of his own production. Eventually the manufacturer will be compelled to pass this additional expense on to the buyer, who in turn should exact it from the buying public which has insisted upon such measures as workmen's compensation, and other so-called reforms.

Those present included Edward F. Powell and George J. Graff, Powell Knitting Co.; W. Park Moore, Brown Knitting Co.; Joseph S. Rambo, Rambo & Regar, Inc., Morristown, Pa.; F. W. Simons, Simons & Struve Hosiery Co.; H. M. Gwynn, Oneida Knitting Co.; A. W. Newman, Notaseme Hosiery Co.; George Taubel, John C. Beageary, Taubel Bros.; Wm. T. Buck, Thos. W. Buck Hosiery Co.; Jas. A. O'Connell, Jas. A. O'Connell Co.; Richard E. Madeley, Pilling & Madeley, Inc.; Edward Blood, Jr., John Blood & Bro.; Robert C. Blood, John Blood & Co.; John M. Reynolds, Harding, Tilton Co.; H. M. Remington, McConnel & Co., Ltd.; R. E. Thompson, Union Special Machine Co.; C. B. Carter, Secretary, and R. L. P. Reifsneider, National Association of Hosiery & Underwear Manufacturers; Harry J. Shoemaker, Secretary, and Walter Linn, Associate Secretary, Pennsylvania Manufacturers Association.

DOUBTS CHANGE IN PRICE

Southern Jobber Believes Retailers' Fixed Scale Permanent

A southern jobber gives his reasons for believing that the fixed retail prices on hosiery and underwear are here to stay, as follows:

"Consumers are accustomed to pay the following prices for their ordinary purchases of hosiery: 10c., 12½c., 25c., 35c., and 50c. This is because of the fact that retailers, jobbers and manufacturers have long recognized these prices as those at which hosiery was most easily retailed.

"In my opinion, the present advance in hosiery prices will lead to the manufacture of a great many new items by hosiery makers. The fiber goods which formerly cost from $1.70 to $1.90 will be improved and will become 35c. lines. The numbers which have been retailing for 50c. and which cost from $3.37½ to $3.62½ from the manufacturer will be manipulated so that the manufacturing costs will be about the same as they are now, although the stockings may be of slightly less value.

"The hosiery retailed in large cities at 19c., 33c., 46c., 79c., etc., does not include more than a small percentage of the total transactions in hosiery in large stores.

"If anyone doubts the fact that hosiery sells most easily at the prices which consumers are accustomed to pay, they can easily prove to themselves that the cost of selling of hosiery at unusual prices is very high. Put two tables in a good position in a retail store, side by side, and put the same stockings on each table; mark one table 12½c. and the other 11c., and it will be found that more stockings will sell off the 12½c. table than off the 11c. table. This is due to the fact that consumers know little technically about hosiery. They form their habits of purchase and life is too short to start a campaign in the endeavor to have them change their habits."

Census Report on 1913-1914 Cotton

The Department of Commerce, Bureau of the Census, has lately distributed its annual bulletin on Cotton Production and Distribution on the 1914 to 1915 crop. This is the first report under the system of closing the cotton year July 31, instead of Aug. 31, as in the past. The report contains detailed statistical tables on the annual production of cotton and linters in the United States as returned by ginners and delinters, distributed by states and counties from 1910 to 1914, inclusive, with statistics of production for previous years; the world's cotton production from 1910 to 1914, by countries; consumption, imports, exports and stocks of cotton and number of cotton spindles in the United States for the year ending July 31, 1914, with detailed statistics of spindles, cotton consumed, cotton on hand, and imports and exports of cotton and cotton goods including comparative figures for previous years; the world's spindles and consumption of cotton and the manufacture of cottonseed products as returned at the census of manufactures covering the season 1913-1914. The bulletin also contains maps of each cotton state with volume of production by counties and a map of the cotton belt with lines representing the limit of the boll weevil region in the years 1909 to 1914. The bulletin contains 102 pages, and copies can be obtained by application to Director of the Census, Samuel L. Rogers, Washington, D. C.

"UNIVERSAL" WINDING MACHINES

The only kind used in this spinning mill for their celebrated knitting yarns

Shop LEESONA Mark

UNIVERSAL WINDING CO.
BOSTON

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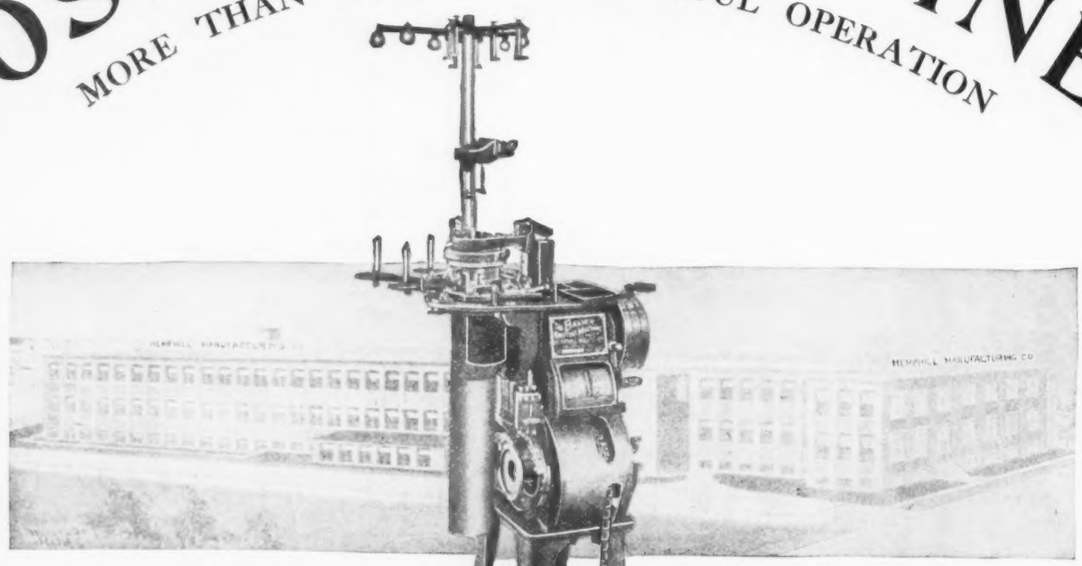
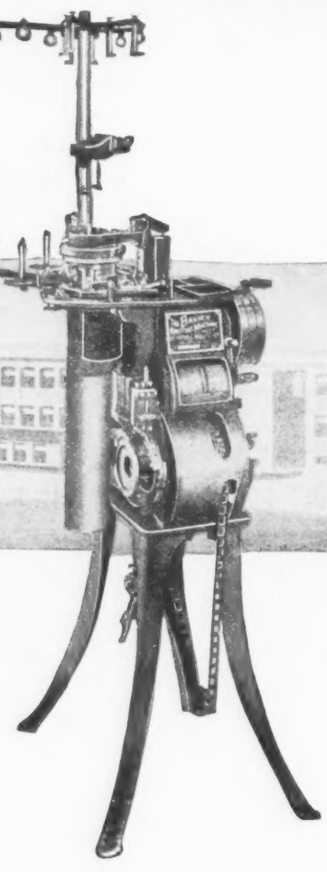
FULL AUTOMATIC

HOSIERY MACHINES

MORE THAN 22,000 IN SUCCESSFUL OPERATION





THE BANNER — THE HEMPHILL MFG. CO. PAWTUCKET, R.I. — TRADE MARK

ALWAYS FIRST WITH THE LATEST

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ALWAYS FIRST WITH THE LATEST

Standard Gauge
260-3¾"

Extra Fine Gauge
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FULL AUTOMATIC HOSIERY MACHINES

These new machines have made possible the success of new lines of extra fine gauge hose and half-hose.

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PAWTUCKET, RHODE ISLAND

Over 22,000 Banner Knitters in Operation

Over 100 Machines Completed Weekly for Home and Export Markets

QUESTIONS AND ANSWERS

(*Continued from page* 13)

silver guides behind the back rollers are working so that nearly the full width of the roller is utilized. The best motion for sliding guides is the old heart motion, with just enough compensating weight to keep the end of the slide pressing against the heart. This will prevent a swell at the end of the motion and ensure even wear on the rollers. This motion is shown at Fig. 6, A, being the roving guides; B, sliding rod; C, balance weight, and D, the heart motion.

John Brown.

FINISHING WOOL HOSIERY

Technical Editor:

What can be used in finishing wool hosiery so that they will absorb moisture instead of drying out? We think the trouble must be in the scouring. We use a high-grade neutral soap built up with soda ash.

Hoosier (2571).

I cannot understand why a manufacturer of hosiery should want his goods to feel clammy and that is what he wants when he states that the goods seem to dry out and feel harsh. The harsh feel is objectionable providing the goods are made from fine wool, but if coarse wool is used he must not expect anything but a coarse and wiry feel and handle. "Hoosier" does not state what amount of soap he is using to a gallon of water, neither does he state the amount of alkali he is using to the gallon of water. If the wool stock has been carbonized he should use a stronger alkali soap than he would if the stock had not been carbonized. "Hoosier" can rest assured that it is not because the goods are clean that they feel harsh. There is some other reason. If a good saponified red oil is used in the picking room and a good soap made up as follows to blend the goods, there will be no more trouble with harsh feel:

Recipe for Red Oil Soap:

100 gals. water.
50 lbs. saponified red oil.
4 lbs. 72 per cent. caustic soda.

Boil not less than 3 hours, the longer the better. When the mixture is cold it will make quite a solid soap which cannot be used in its present form. Mix in another tank for washing the hosiery one gallon, of the soap to 2 gallons of water, with 4 ozs. of pure alkali to the gallon. Boil from 1 to 1½ hours. When cold use for washing. If red oil is used in the picker room it will be found that the hosiery is so easily cleaned that the amount of alkali can be reduced to 3 ounces or perhaps 2 ounces. Any manufacturer of wool hosiery or in fact of any class of wool goods who uses saponified red oil in the picking room will never be troubled with greasy goods.

Anthony.

DRY CARDED SHODDIES

Technical Editor:

We have received a number of calls for shoddies "dry carded." It seems that these stocks are worked into goods which are not scoured, and therefore the oil is offensive. Can you give us a formula for making an emulsion for same? We understand there is an emulsion used, consisting of a small proportion of soap well mixed with water.

Carder (2578).

The above query is not quite clear. No reason exists why the oil used in this case should be offensive if it is of good quality. Since carding is a mechanical operation, it is not essential because the material to be carded is shoddy, that low grade or otherwise cheap oils should be used. For the purpose of emulsifying an oil, the most satisfactory method to pursue is to use a potash or soft soap of the type commonly known in most mills as an English fig soap, which always contains beside a fair quantity of water, an amount of glycerine that materially aids in making an emulsion that "holds." An exact formula cannot be given, since the amount of mineral oil "Carder" uses is not known. He will have to work out his own recipe, bearing in mind that a uniform emulsion is possible only when the soap has been dissolved, and the oil added while both are agitated by means of a paddle or other appliance.

By adding the oil to the solution of soap, an emulsion that "holds" for a considerable length of time can be obtained. Do not add the soap to the oil.

Berwick.

KNITTING MILL NEWS

*Philadelphia, Pa. Chesterman & Streeter, Inc., manufacturers of elastic hosiery, have, as noted, purchased the Montgomery Mill of John Sullivan & Sons Manufacturing Co., 9th & Montgomery Avenue, and are removing their machinery to that building. Various improvements will be made, and it is understood there will be additions made to their present equipment. The property includes a five-story brick building along the Philadelphia & Reading R. R., with a lot of 202 x 80 feet. It will be remembered that J. Sullivan & Sons Manufacturing Co. erected a large addition to their plant on Delhi Street at the rear of their main plant.

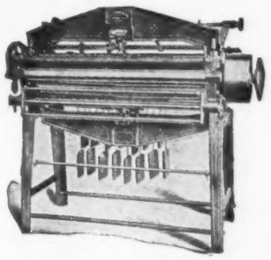
Salt Lake City, Utah. Business at the plant of the Salt Lake Knitting Works is reported as flourishing. Improvement during the last year necessitated the installation of about five new machines and several more have been ordered, it is understood. Men's and women's ribbed and full-fashioned underwear and union suits, seamless and full-fashioned hosiery, fancy knit goods, etc., are manufactured, with an equipment at last report of 20 latch and spring needle knitting machines, 14 sections full-fashioned machines and 75 sewing machines.

Windsor, N. S., Canada. The Nova Scotia Underwear Co. expects to be running in about five weeks in its new mill. The main plant of the company is at Eureka, N. S.; men's and boys' ribbed underwear, woolen, are manufactured.

Hamilton, Ont., Canada. J. S. Thompson and Percy M. Smith, formerly general manager and superintendent, respectively, of the Zimmerman Manufacturing Co., men's, women's and children's underwear, are now with the T. Eaton Co., Ltd. It is understood that the Eaton Co. is contemplating the construction of a spinning mill in Hamilton in addition to the new knitting mill now in course of erection.

Boyertown, Pa. G. W. Unger, operating the Crescent Knitting Mill on women's cotton ribbed underwear is understood to be looking for a location, with railroad facilities, for the establishment of a branch plant. It is stated that business is being received at the present mill in such volume as to make its handling impossible; there are enough orders on hand at the present time to keep two mills working until December, it is stated. Equipment of the present plant comprises 27 latch needle knitting machines, 14 ribbers, 30 sewing machines, etc.

New Castle, Pa. Stockholders of the New Castle Knitting Mills have voted to increase the capital stock from $100,000 to $250,000 to provide additional working capital and to finance improvements. The mills have a large number of orders on hand, sufficient to keep the plant running full time for several months, and it is stated that the company is amply covered with dyestuffs. Men's and women's cotton hosiery are manufactured with 100 knitting machines. The company has made a number of extensions of its plant since its organization in the summer of 1914.



50% Better than ever from YOUR standpoint

SEVERAL NEW FEATURES

have been added to the "1912" Cloth Cutting, Folding and Winding Machine which **add at least 50 per cent. to its value to YOU.**

It will cut your cloth—fold the edges—roll it up and give you an exact measurement of every piece of cloth going through the machine.

It saves time, labor, machine and cloth.

YOU ONLY NEED ONE MACHINE where before it required two, and you get an **extra** strip from every bolt of cloth.

It cuts the corners of expense in every way, and leads to **more and greater profits.**

THE ENORMOUS SAVINGS WILL INTEREST YOU.

J. A. FIRSCHING

614 Broad St., Utica, N. Y., U. S. A.

Dept. "B"

HOW TO TIER **BOXES!**

Do it the quick cheap safe efficient way by using the

REVOLVATOR

Reg. U.S. Pat. Off.

Write for Bulletin T. W.-27

It tells all about the time, labor, space saving machine

Manufactured and Sold by the

N. Y. Rev. Port. Elev. Co.

340 Garfield Ave. Jersey City, N. J.

188

New Jersey Textile Wire Stitcher

Highest Grade

Machine for rapid and Economical Method of Attaching Labels to Hosiery or other Garments.

Uses pointed staples, cannot tear the finest fabric.

Send for Catalogue

J. L. Shoemaker & Co., 15 S. Sixth Street PHILADELPHIA

An Accurate and Sensitive Balance for Textile Use

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Style No. 5020

Working parts and graduated beam enclosed in glass metal case.

For further particulars mention Style No. 5020.

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THE TORSION BALANCE COMPANY

Factory, Jersey City, N. J. Office, 92 Reade St., N. Y.

Pacific Coast Branch - San Francisco, Cal.

PROMPT SERVICE RIGHT PRICES

BONE DRY HOSIERY FINISHING BOARDS

THAT WORK ABSOLUTELY SMOOTH

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FULL AUTOMATIC KNITTING MACHINES

Yarn Changers and Platers
For Seamless Hosiery
Easy Transfer
Accurate Measuring Device
Produces Finest Fabrics

PAXTON & O'NEILL

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Processes Special Machinery
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LABORATORY WILTON, N. H.

ASHDALE BLEACHERY

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PHILADELPHIA

Bleachers of Hosiery

Cotton, Mercerized Silk, Art Silk and Wool

Specialists in Peroxide of Lime Bleaches

Satisfactory work and prompt deliveries guaranteed.

PHOTOGRAVURE LETTERHEADS

WOODBURY & COMPANY, INC.
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Telephone Main 3593 Established 1854

CROSBY & GREGORY

HEARD, SMITH & TENNANT

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Old South Building BOSTON

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Special Attention to Textile Inventions

L. T. IVES CO.

Established 1874. Manufacturers of all kinds of

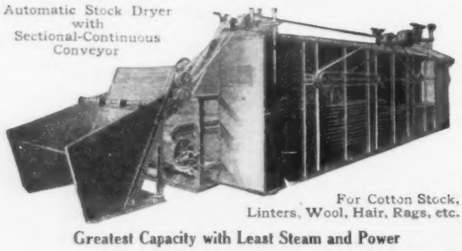
Spring Knitting Needles

Slides, Sinkers, Jacks, Etc.

NEW BRUNSWICK, N. J.

"HURRICANE" DYEING, DRYING AND FINISHING MACHINERY, PRESSES, ETC.

FIRE-PROOF "HURRICANE" DRYERS



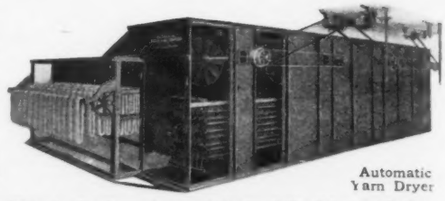
Automatic Stock Dryer with Sectional-Continuous Conveyor

For Cotton Stock, Linters, Wool, Hair, Rags, etc.

Greatest Capacity with Least Steam and Power

(STEEL AND ASBESTOS CONSTRUCTION)
BUILT IN MANY SIZES AND TYPES FOR
RAW STOCK, WARPS, HOSIERY, UNDERWEAR, CLOTH, YARN, ETC.

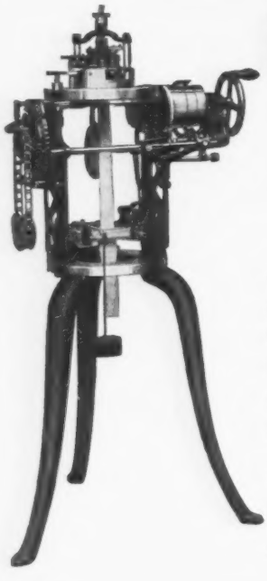
Complete equipments for
DYEING, BLEACHING
SCOURING AND CARBONIZING



Automatic Yarn Dryer

Write for Catalog on Automatic Drying & Conditioning Machines

THE PHILADELPHIA DRYING MACHINERY CO.
MAIN OFFICE AND WORKS: 6721 GERMANTOWN AVE., PHILADELPHIA, PA.



H. Brinton Co.

PHILADELPHIA, PA.

RIBBERS

Single and Double Feed

with all latest improvements, such as Welt and Slack Course Selvage Welt, French Welt, Dogless attachment, Double Knee, Two-speed Drive, Yarn Changers, Automatic Stop-motions.

Built in all sizes, for all classes of rib work.

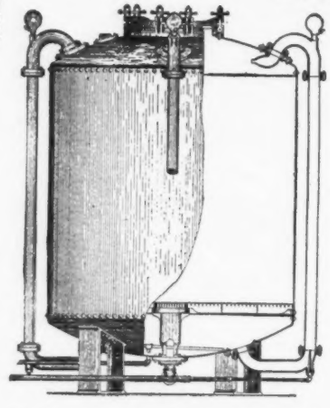
Samples and prices on request.

ALLEN PATENT KIERS

"ALLEN INJECTOR" KIER
As Illustrated

"ALLEN WORCESTER" KIER
Electric Driven Circulator with Indirect Heater

"ALLEN HYDRAULIC" KIER
For Raw Stock. Unloaded in 30 Minutes



Our new "Worcester" Kier is mechanically correct.

No live steam is admitted to Kier.

Let us show you why we can obtain absolutely uniform results with less consumption of steam in this type of Kier.

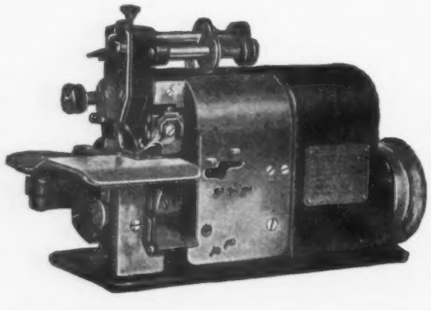
Many of the largest mills of the country are installing these Kiers.

Let us show you how you can improve on your present system.

Write us.

WORCESTER STEAM BOILER WORKS
Wm. Allen Sons Co., Prop.
WORCESTER, MASS.

USE THE MERROW
OVERSEAMING MACHINES



For finishing fabrics in
One Operation

THE MERROW MACHINE CO.

HARTFORD, CONN.

—Showrooms—

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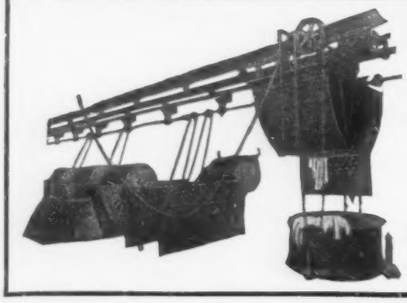
CONTINENTAL LATCH NEEDLE CO.
NEW YORK
THE WORKMANSHIP AND QUALITY OF OUR GERMAN NEEDLES ARE UNSURPASSED OUR SCREW RIVET DOES NOT GET ROUGH OR LOOSE.
LARGE STOCK OF NEEDLES FOR ALL AMERICAN AND FOREIGN KNITTING MACHINES
N.Y. OFFICE 120 LIBERTY ST
WORKS, EBINGEN, GERMANY



SULPHUR BLACK

FOR HOSIERY

DYEING MACHINERY and BLEACHING MACHINES

Circulating Dyeing Machines. For Hosiery, Underwear, Raw Stock, and Rags. Singeing Machines for Hosiery. Mercerizing Machines.

Smith, Drum & Co.

Allegheny Ave., below 5th St. Philadelphia, Pa.

WILDT & CO., Limited

The Boulevard Leicester, England

KNITTING MACHINE BUILDERS AND EXPORTERS

Please write for catalogues

We are also open to negotiate for the import of American Underwear Machinery for the European market

SUPPLY MARKETS—RAGS, SHODDY, ETC.

QUOTATIONS

Wool Waste.

Fine white Australian lap waste	65	@68
Fine white lap waste	56	@60
Fine colored lap waste	50	@60
Medium colored lap waste	35	@40
Fine white Australian ring waste	58	@63
Fine white ring waste	50	@53
Fine white Australian thread waste	50	@55
Fine white thread waste	46	@52
Medium white thread waste	35	@45
Low white thread waste	29	@34
Fine colored thread waste	20	@25
Medium colored thread waste	15	@20
White spinners' waste, greasy	20	@26
Colored spinners' waste, greasy	15	@22
Australian white cards waste, dusted	28	@32
Fine white card waste, dusted	24	@30
Medium white card waste, dusted	20	@25
Colored card waste, fine, clean	6	@12
Colored card waste, medium	2	@ 7

Carpet Ravelings.

No. 1 new, old wool	—	@10
No. 2 old, light wool	7	@ 7½
No. 3 old, dark wool	5½	@ 6
No. 4 union	4	@ 4½
No. 5 cotton	2½	@ 3

New Woolen Rags.

Fine clip	21	@22
Ordinary clothing clips	19	@20

CLOTHING CLIPS.

Worsteds—		
Light	25	@26
Black	35	@37
Blue	30	@32
Dark	20	@22
Edges	20	@22
Cloth—		
Fine, light, black and white	24	@25
Medium light	15	@16
Coarse light	15	@16
Black	18	@19
Oxford	19	@20
Blue	19	@20
Unions—		
Ordinary	6½	@ 7
Light	—	@ 8½
Government Clips—		
Soldier blue	19	@20
Indigo	20	@21
Khaki	32	@33
Cadets	26	@27

CLOAKING CLIPS.

Worsteds—		
Serges—		
White	36	@37
Blue	28	@29
Black	26	@27
Brown	27	@28
Red	27	@28
Green	27	@28
French Flannels—		
Very light	25	@26
Mixed	17	@18
Black	20	@21
Kersey—		
Tan	19	@20
Brown	19	@20
Red	19	@20
Green	19	@20
Blue	19	@20
Light blue	21	@22
Black	19	@20
Cloakings—		
Cotton warp mixed	6½	@ 7
Cotton warp gray	11½	@12
Cotton warp mackinaws	7	@ 8
Brown	—	@ 9
Green	—	@ 9
Blue	—	@ 9
Oxford	—	@ 9

Old Woolen Rags.

Merinos—		
Fine light	20	@21
Coarse light	15½	@16
Fine dark	16	@17
Coarse dark	13	@14
Fine black	16	@17
Small	7	@ 8
Serges—		
Light	18	@19
Brown	18	@19
Blue	17	@18
Black	17	@18
Red	19	@20
Green serge	20	@21
Flannels—		
Fine white	29	@30
Coarse white	28	@29
White No. 2	22	@23
Red	17	@18
Blue	14	@15
Knit—		
White	32	@33
Blue, dark	17	@18
Blue, light	17	@18
Blue, mixed	17	@18
Black, trimmed	20	@21
Black, untrimmed	16½	@17½
Red	18	@19
Brown	17	@18
Light gray	11	@12
Steel gray	18	@19
Dark	14	@15
Fancy	14	@15
Hoods—		
Light	19	@20
Delaines—		
Skirted	5	@ 6
Linseys—		
Red flannel	4	@ 4½
Best plaids	4½	@ 5
Best brown	4½	@ 5
Best blue	4½	@ 5
Common gray	1¼	@ 1½
Blankets—		
Wool, horse	6	@ 6½
New blue clips	25	@28
New black, fine worsted	28	@30
Light yarn, extra fine	30	@35
Light yarn, worsted	33	@38
Dark mixed, extra fine and free from cotton and silk	26	@30
Dark mixed, No. 2	18	@22
Med. to coarse grades, all wool yarn	22	@25
Red flannel, all wool	22	@24
Red knit stock, strictly all wool	25	@27
No. 1 dark blue for hosiery, strictly all wool	24	@25
No. 2, same, not all wool	17	@20
Fine dark merino, all wool, No. 1	17	@19
Med. dark merino, all wool, No. 2	16	@18
Med. dark merino, not extracted	13	@14
Med. dark merino, all wool	15	@16
Fine light merino, all wool	28	@30
Fine black merino, all wool	18	@21
Medium light merino, all wool	23	@25
Med. light merinos, extracted	18	@20
Medium black	15	@20
To order: Olives, all wool, fine	20	@25
Blues, all wool	20	@25

SKIRTED CLOTHS.

Skirted worsteds—		
Light	15	@16
Black	20	@21
Blue	16	@17
Dark	13½	@14
Brown	16	@17
Skirted Cloth—		
Fine light	13	@14
Light	10½	@11
Blue	9	@10
Plain black	9	@10
Dark	8	@ 9
Skirted, tan kersey	16	@17
Skirted, tan covered	16	@17

Shoddies and Extracts.

Fine white yarn, best all wool	50	@55
Med. and coarse white yarn, all wool	38	@40
White knit stock, best fine all wool	34	@38
White knit stock, No. 2	31	@33
New Blue clips, best, fine worsted	28	@30

SALES LIMITED BY LACK OF DESIRABLE GRADES

Prices Advance on Stocks in Active Request—Odd Lots of Old Stock Moved at Full Prices

Conditions in the rag market are not essentially different from those prevailing for several weeks past; prices are firm on all grades with slight advances on certain of the stocks in most active request. One of the chief difficulties that confronts the dealer at present is the obtaining of stocks to replace the quantities sold to manufacturers. Collectors of mixed rags apparently are securing lighter supplies as the offerings are very scanty. In fact, they are not only of small quantities, but are particularly noticeable because of their infrequency. Many dealers claim that prices obtained from manufacturers do not fully represent the advance in cost at first hands, and further state that it is an utter impossibility to replace their holdings at the figures now quoted as the selling price. In one particular instance the dealer offered for the renewal of a contract a price several cents higher than he felt justified in doing, largely with a view to holding his source of supply, to be met with the information that another offer had been received 5c. a pound higher.

DESIRABLE STOCKS SCARCE

It is rapidly becoming a serious problem to find stocks that can be turned over at a profit, or, indeed, to secure many of the grades which manufacturers are in search of to complete orders now in hand, and there is every indication that when the heavy-weight season is once fully under way this condition of affairs will become much more evident. Shoddy manufacturers, in general, have kept more closely in touch with market conditions and are in better shape as far as supplies are concerned than are the cloth mills that convert their own rags or purchase the rags and have them converted by commission shoddy makers. The majority of dealers express themselves as of the opinion that prices are bound to reach higher levels unless something unforeseen occurs to decrease the demand, a somewhat remote contingency in the face of a heavy-weight season which shows every indication of being the best in many years.

In many cases inability to obtain the exact type of material required has compelled manufacturers to purchase substitutes, a feature which has enabled dealers to move odd lots that have been in their lofts for months or possibly years. With the increase in prices has developed a tendency to depreciate quality to a certain extent, a few grades throwing the bulk of doubtful rags into the higher grades rather than into the next lower.

NO SUBSTITUTE CHANGES

Most of Activity Confined to Old Orders and Deliveries

BOSTON, Jan. 5.—There have been no changes of importance in substitutes during the week and while dealers are busy most of their activity is confined to deliveries on old orders. For the time being manufacturers are not placing new business but this is to be expected at this period and most dealers are firm in the belief that when the heavy-weight season really opens there will be some very active trading. The price situation remains very firm and tending upward and for good grades of the most desired stocks dealers are asking substantial premiums.

The chief difficulty that shoddy manufacturers have to contend with is the rag supply and the prices of these stocks. Blacks and blues in almost every description are in heavy demand but few shoddy manufacturers are able to secure any appreciable supply. New shoddy orders have been rather scarce within the past week or two but most shoddy manufacturers are so well employed and the immediate future presents so many uncertainties that few of these manufacturers are actively seeking new business. While there is no acute scarcity of stock in the market, there is no large supply of any qualities and the opinion is expressed by not a few shoddy manufacturers that when buying develops into larger volume considerable difficulty will be experienced in filling demands and some substantial price advances are looked for.

Most wool waste dealers are doing a good business but a very large movement is restricted only by the scarcity of desired stocks. Threads and low wastes are in very good demand, particularly solid colors, but few dealers have any appreciable supply and are unable to trade in the market except at prices that leave but little, if any, profit. Many dealers are now contracting with mills for their waste supply for the new year, and while prices have not been made public, it is reported that mills are exacting strong figures. Quotations in the market show no material change but in many instances dealers demand premiums.

MILLS INCREASE WAGES

An Eight Per Cent Advance Granted to Operatives in Cohoes Plants

COHOES, N. Y., Jan 4 (*Special*).—An 8 per cent. increase has been granted by the bat and shoddy manufacturers to the garnet workers. The increase went into effect Monday. The operatives have had several conferences with the mill owners in order to have their pay increased from $11.10 to $13.25. After several meetings a compromise was effected, the men being granted an increase of from $11.10 to $12.

The Star Woolen Co., National Textile Co., Troy Waste Co., Peerless Fiber Co., United Waste Manufacturing Co., Clute Bros., Page Manufacturing Co. and Lowenthal & Co.

All of these mills are working day and night to fill rush orders that have accumulated. One of the mill owners said that business in the bat and shoddy line was the best that it has been for many years.

GREENSBURG, PA. A charter has been filed for the Manhattan Woolen Mills Co., with a capital stock of $100,000. Incorporators: George Hockensmith, John R. Clarke and Robert E. Evans.

SHERWIN WOOL CO.
SPECIALIZES YOUR REQUIREMENTS
Woolen Rags
213 A Street BOSTON

JOHN J. CONNELL
Dealer in
COTTON AND WOOL
COTTON AND WOOL WASTE
SHODDIES AND FLOCKS
239 and 241 N. Front St. Philadelphia, Pa.

FRANKEL BROS. & CO.
42-48 Commercial St., Rochester, N. Y.
We grade new and old woolen and cotton rags ready for the picker.
CORRESPONDENCE SOLICITED

GORDON BROS., Inc.
Manufacturers and Dealers in
Wool Shoddy, Wool Extracts, Wool Waste, Woolen Rags
Telephone Connection
HAZARDVILLE, CONN.

S. RAWITSER & CO.
WOOLEN RAGS
WOOL WASTE, SHODDIES, FLOCKS, NOILS AND EXTRACTS
283-285-287 West Broadway NEW YORK
Our specialty is to grade woolen Rags of every description ready for the picker.

B. COHEN & SONS
LARGEST GRADERS OF
New WOOLEN and COTTON CLIPPINGS
AND ALL KINDS OF REMNANTS
Write Us for Prices
1244-46 S. UNION STREET CHICAGO

The W. L. LOESER CO. BUFFALO, N. Y.
Graders of Woolen Rags
Uniform Quality
Manufacturers of Empire Baling Press
Hand or Power

BALING PRESSES
FOR ALL PURPOSES
ALL STEEL ECONOMY FIRE PROOF
Largest Line in the U. S. *Write*
ECONOMY BALER CO., Dept. J, Ann Arbor, Mich.

CATLIN & COMPANY
COTTON YARNS
SOLE AGENTS FOR
LAWTON SPINNING COMPANY
HAMILTON MFG. COMPANY
TREMONT and SUFFOLK MILLS
and other mills furnishing full range of all numbers
NEW YORK BOSTON PHILADELPHIA CHICAGO

T. E. HATCH
COTTON YARNS
ALL COUNTS AND VARIETIES
77 Franklin Street, Boston, Mass.

JEWEL COMBED YARNS
Direct
Johnston Manufacturing Co.
COTTON YARNS OF ALL DESCRIPTIONS
C. W. JOHNSTON, President, Charlotte, N. C.
R. W. STOKES, Manager, 308 Chestnut Street, Philadelphia, Pa.

The John F. Trainor Co.
291 Broadway, New York
American, Egyptian and Sea Island Yarns
Both Natural and Mercerized

JOHN F. STREET & CO.
COTTON YARNS
12 So. Water Street PROVIDENCE, R. I.
CHICAGO PHILADELPHIA NEW YORK

GATE CITY COTTON MILLS
Manufacturers of Superior Quality
RING SPUN HOSIERY YARN MULE SPUN
We sell direct to Knitters and guarantee satisfaction
1209-10 Fourth National Bank Building, ATLANTA, GA.

RHODE ISLAND PROCESSING CO., Inc.
W. R. GILLESPIE, Gen'l Mgr.
Converters of COTTON YARNS, MERCERIZING, DYEING, BLEACHING AND WINDING
MILLS AT COVENTRY, R. I. SAMPLES SUBMITTED ON REQUEST

THEO. H. STROUSE & CO.
36 S. Third Street PHILADELPHIA, PA.
MERCERIZED COTTON YARNS PLAIN
SKEINS WARPS CONES COPS TUBES

JAMES E. MITCHELL COMPANY
COMMISSION MERCHANTS
COTTON YARNS FOR ALL PURPOSES
185 Summer Street Brown Building BOSTON, MASS.
122-124 Chestnut Street, PHILADELPHIA, PA.

ALBERT RAU, Inc., Commission Merchants
Carded or Combed **COTTON YARNS**
All Numbers for All Purposes
52 LEONARD ST., NEW YORK

Deal Direct With the Mill
COLUMBUS, GA.
White and Colors
SWIFT SPINNING MILLS
MUSCOGEE MFG. CO.
High Grade WEAVING and KNITTING YARNS
Represented by
VAN COURT CARWITHEN
300 Chestnut Street, Phila.

COTTON YARN QUOTATIONS

The following quotations have been compiled in Boston.

EASTERN PEELER CONES.

	Carded.	Combed.
8s	21½ @22	28½ @29
10s	22 @23	29 @30
14s	23 @24	30 @31
16s	23½ @24½	31 @32
20s	24½ @25	32 @33
22s	25 @26	33 @34
24s	26 @27	34 @35
26s	27 @28	35 @36
30s	29 @30	37 @38
32s	30 @31	38 @39
34s	31 @32	39 @40
36s	32 @33	40 @41
40s	34 @35	42 @43

EASTERN TWO-PLY SKEINS.

	Peeler. Carded.	Combed.
12s	25 @26	30 @31
14s	26 @27	31 @32
16s	27 @28	32 @33
18s	28 @29	33 @34
20s	29 @30	34 @35
22s	30 @31	35 @36
24s	31 @32	36 @37
26s	32 @33	37 @38
28s	33 @34	38 @39
30s	34 @35	40 @41
36s	37 @38	44 @45
38s	38 @39	45 @46
40s	39 @40	46 @47
50s		53 @56
60s		60 @65
70s		70 @75
80s		80 @85

EASTERN TWO-PLY WARPS.

	Carded.	Combed.
2-30s	35 @36	41 @42
2-36s	38 @39	44 @45
2-40s	40 @41	48 @49
2-50s		53 @55
2-60s		61 @66
2-70s		71 @76
2-80s		81 @86

EGYPTIAN (COMBED) WEAVING YARN.

SINGLE SKEINS.

30s	47 @48	55s	62 @64
35s	50 @51	60s	66 @67
40s	53 @54	70s	75 @76
45s	56 @57	80s	85 @86
50s	59 @60	90s	95 @96

TWO AND THREE-PLY SKEINS.

30s	48 @50	65s	71 @73
35s	51 @53	70s	77 @80
40s	54 @56	75s	82 @84
45s	57 @59	80s	87 @90
50s	60 @62	90s	97 @100
60s	67 @69		

TWO-PLY WARPS.

2-30s	49 @50	2-50s	61 @62
2-35s	52 @53	2-60s	68 @69
2-40s	55 @56	2-70s	78 @80
2-45s	58 @59	2-80s	88 @90

EGYPTIAN YARNS ON COPS.

	Carded.	Comber.
6s & 8s	29 @30	34 @35
10s & 12s	30 @31	35 @36
14s	31 @32	36 @37
16s & 16s	32 @33	37 @38
18s & 20s	33 @34	38 @39
20s	34 @35	39 @40
24s	35 @36	40 @41
26s	36 @37	41 @43

COMBED SEA ISLAND.

	Single.	Two-ply.	Reverse twist thread yarn.
12s	48 @49	— @—	50 @51
14s	49 @50	— @—	51 @52
16s	50 @51	— @—	52 @53
18s	51 @52	— @—	54 @55
20s	52 @53	— @—	55 @56
23s	53 @54	— @—	57 @58
28s	54 @55	— @—	59 @60
30s	55 @56	— @—	60 @61
40s	60 @61	59 @60	65 @66
60s	71 @72	71 @72	77 @78
70s	78 @80	79 @80	85 @86
80s	88 @90	90 @91	96 @97
90s	96 @98	— @—	1 05 @1 07
100s	1 02 @1 07	1 10 @1 25	1 07 @1 12

Sea Island warps and skeins for mercerizing are worth 2 or 3 cents less than thread yarn.

The following quotations have been compiled in Philadelphia, New York and Providence.

SOUTHERN SINGLE SKEINS.

WARP TWIST.

6s & 8s	18½ @19	20s	— @22½
10s	19 @19½	24s	— @23½
12s	20 @20½	26s	23½ @24
14s	— @21	30s	26 @27
16s	21 @21½	40s	34 @36

SOUTHERN TWO-PLY SKEINS.

2-8s	19 @20	2-24s	25½ @26
2-10s	20 @21	2-26s	26½ @27
2-12s	20½ @21½	2-30s	— @28½
2-14s	21 @21½	2-40s	36 @38
2-16s	21½ @22½	2-50s	45 @46
2-20s	23 @23½	2-60s	— @52

SOUTHERN SINGLE WARPS.

10s	19½ @20	24s	23½ @24
12s	— @20	26s	24½ @25
14s	21 @21½	30s	27 @27½
16s	21½ @22	40s	35½ @36
20s	22 @22½		

SOUTHERN TWO-PLY WARPS.

2-8s	20 @21	2-24s	25½ @26
2-10s	— @21	2-26s	26½ @27½
2-12s	— @22	2-30s	28½ @30
2-14s	22 @22½	2-40s	36 @38
2-16s	23 @23½	2-50s	44 @45
2-20s	23½ @24	2-60s	52 @53

3-8s hard twist on tubes, 18@20 cts.; 3-8s skein and 4-8s skein, 19@20 cts.; 2-10s and 2-12s slack, 21 cts.

SOUTHERN CONE (FRAME SPUN) YARNS.

6s	— @19⅜	20s	22 @—
8s	— @20	22s	22 @22¼
10s	20 @20½	24s	23 @23½
12s	20¾ @21	24s Extra	24 @24½
14s	21¼ @21½	26s	— @25
16s	21½ @21⅝	30s	26 @26½
18s	21½ @22	40s	— @33

BLACK AND WHITE D. & T. SKEINS.

(All prices nominal.)

(Carded.)

2-20s	40 @41	2-30s	42 @43
2-24s	40 @41	2-40s	49 @50
2-26s	41 @42		

Staple Combinations.

8—30s	38 @39	20—40s	— @46
10—30s	38 @39	20—60s	— @54
14—16s	— @40	16—80s	— @59
16—30s	40 @41	16—120s	— @70

Jack spools, 2 cts. more; colors, 2½@4 cts. more than black and white.

BLENDED BLACK AND WHITE SKEINS.

2-16s	42½ @44½	2-26s	45½ @47½
2-20s	43½ @45½	2-30s	46 @48
2-24s	44½ @46½	2-40s	53 @55

For 25 per cent. blend, 2c. less; for 75 per cent. blends, 2c. more.

EASTERN PEELERS AND EGYPTIANS.

(Cones or tubes.)

Combed Peeler.		Combed Egyptian.	
2-20s	40 @41	2-20s	36 @40
2-24s	41 @42	2-24s	37 @41
2-28s	43 @44	2-28s	39 @44
2-30s	44 @46	2-30s	41 @45
2-34s	47 @48	2-34s	43 @47
2-36s	48 @49	2-36s	44 @48
2-38s	50 @51	2-38s	46 @50
2-40s	49 @51	2-40s	52 @53
2-50s	57 @58	2-50s	61 @62
2-60s	64 @67	2-60s	71 @72
2-70s	72 @74	2-70s	81 @82
2-80s	79 @82	2-80s	91 @92

CARDED PEELER CONES.

10s	22 @23	24s	26 @27
12s	22 @23	26s	27 @28
14s	23 @24	28s	26½ @27
16s	— @22	30s	29 @30
18s	23½ @24½	32s	30 @31
20s	24½ @25	34s	31 @32
22s	25 @26		

CARDED SHUTTLE COPS.

8s	— @20	26s	— @26½
10s	— @20½	28s	— @28
12s	— @21	30s	— @30
14s	— @21½	32s	— @31
16s	— @22	34s	— @31
18s	— @22½	36s	— @33
20s	— @23	38s	— @35
22s	— @23½	40s	— @36

SOUTHERN COMBED SEA ISLAND.

WARPS AND SKEINS.

2-20s	— @51	2-60s	66 @70
2-30s	— @52	2-70s	72 @75
2-36s	— @54	2-80s	— @78
2-40s	— @55	2-100	— @98
2-50s	— @62		

SOUTHERN COMBED PEELER.

WARPS, SKEINS AND CONES.

2-30s	38 @39	2-60s	58 @60
2-36s	41 @42	2-70s	63 @64
2-40s	42 @44	2-80s	69 @74
2-50s	51 @52	2-100s	91 @92

SINGLES.

30s	— @35	60s	56 @58
40s	41 @42	70s	— @63
50s	49 @50	80s	68 @70

MERCERIZED COMBED PEELER YARNS ON CONES (UNGASSED.)

Southern Yarns.		Eastern Yarns.	
2-20s	— @50	2-20s	— @51
2-30s	53 @56	2-30s	50 @55
2-36s	54 @56½	2-36s	53 @58
2-40s	— @57	2-40s	59 @62
2-44s	59 @60	2-44s	64 @66
2-50s	64 @66	2-50s	66 @71
2-60s	73 @76	2-60s	75 @78
2-70s	84 @86	2-70s	86 @90
2-80s	93 @91	2-80s	94 @1 00
		2-100s	1 15 @1 20

Extra cost for gassing approximate: 30s and below, 4c.; 30s to 40s, 4½c.; 40s to 50s, 5½c.; 50s to 60s, 6c.; 60s to 70s, 7c.; 70s to 80s, 8c.; 80s to 100s, 11c.

Less cost for skeins: 20s and below, 3c.; 20s to 30s, 4c.; 30s to 40s, 4½c.; 40s to 50s, 5s.; 50s to 60s, 6c.; 60s to 70s, 7c.; 70s to 80s, 8c.; 80s to 100s, 11c.

YARN MARKETS—COTTON—Continued

COTTON YARNS FIRM WITH DEMAND FOR MARCH-APRIL

Weavers Covered for Spot Shipments—Contract Prices Generally Up

Cotton yarn prices have held firm, although sales have not been on a large scale, and the outlook is bright. Immediate demands of the largest manufacturers have been covered, and, although there is some demand for spot shipments, the chief inquiry is for later months. Spinners are confident of a higher market, and in view of increased expenses are, in certain cases, asking ¼c. advance for each month beyond January and February. The prospect for a large volume of business is good, as buyers are entering the market, and it is the opinion of spinners that they will not hold off much longer, but will pay the advanced prices asked for future delivery. There is little demand for southern single warp yarns, as many manufacturers have switched to two-ply yarns, which are chiefly in demand from 20s to 40s. Weavers are known to hold large orders for goods, and inquiries for yarns point to large future takings. Fine combed yarns are firm, but spinners are not able to make deliveries before April, and are unwilling to accept present prices. The result is that many numbers have been placed practically at value.

KNITTERS ENTERING MARKET

Knitters are coming into the market earlier than usual this season, and a resumption of business on a large scale is expected. Prices are firm and are expected to hold at present high levels. Several large orders for export have been reported, and domestic takings have been good for this time of year, but stock taking still affects liberal buying. Yarn dealers are free to concede that the New Year has opened with the market in better shape than they have seen it in years.

YARN BUSINESS DEVELOPS

Cotton Yarns Show Good Inquiry at Advanced Prices

PHILADELPHIA, Jan. 5.—Inquiry for cotton yarns still marks the local trade, and dealers report improvement in conditions, with more sales at better prices. Spinners continue to hold firmly to their quotations, and most dealers say there are no marked changes this week in average prices from the South. Indications seem to point to good business from now on. Manufacturers having taken account of stock find they are in need of yarns for immediate use, and are therefore buying as best they can. At the same time they have been waiting for prices to break, and have waited so far in vain; overstaying has helped to bring about the active interest now reported.

COARSE YARNS DULL

Sales, as a rule, are not for any great time ahead. Weavers seldom buy in this fashion, anyhow, and now, with high prices and uncertain dyestuff supplies, they feel they had better be cautious about plunging too far in yarns. With stocks of merchandise reported low all over the country, prospects for business are considered promising. Dealers say they are able to get prices much nearer spinners' quotations than they could a week or so ago by reason of this development of business. Most of the trade seems to be on higher grade yarns in finer counts. Low numbers appear neglected of late; this is attributed to the tendency of local mills to make a better product than formerly, as they have not been able to compete with southern mills, for example, in turkish towels. Single yarns, therefore, are quiet in such numbers as 10s to 14s.

SALES AT ADVANCES

Yarns above 20s two-ply are generally firmer in proportion than lower numbers; for example 20s two-ply warps are held at 23½ to 24c., while 30s two-ply are reported sold at 29½ to 30c. Possibly they can be purchased at 29c., as dealers say they are being frequently surprised by a small lot of stock yarns sneaking in underneath their offer, but it is not believed many can be had at this price, as this number seems scarce. The same applies to 40s two-ply; average yarns are held at 37 to 38c., with good breaking strength at 39 to 40c. In low numbers 8s three-ply are quiet in carpet stock at 19c. with 18½c. more nearly the market, while 16s two-ply skeins are quoted 21½ to 22c. With good orders on their books and a firm spot cotton market, spinners are holding firmly.

FRAMESPUN YARNS QUIET

Framespun knitting yarns are still quiet at present. More attention is being given to combed yarns and finer grades by buyers, as these seem to be the yarns most needed at present. Underwear mills have been enjoying a good business right along, with their seasons overlapping, but most of these mills are covered for their needs, and hence are not buying much. Most houses report more activity from weavers now than from knitters. Therefore 24s framespun is quiet at 24c, with 23½c. also quoted; while 10s are at 20½ to 21c., with a limited possibility of 20c. in certain quarters. For mule-spun yarns, 10s are quoted 21½ to 22½c. Hosiery mills particularly show more interest in combed yarns now, and this is believed to be due to the cost of dyeing in heavier framespun yarns. Knitters usually buy in larger quantities for future needs, than other trades, and most mills appear to be covered for the present which may also account for the greater activity in weaving yarns.

COMBED YARNS FIRM

Trading in combed yarns continues to show satisfactory progress. Inquiries are reported in fair volume, and sales are developing, although many mills are not prepared to take on additional orders for early delivery. This has helped to make prices firm, and spinners are taking advantage of the increased business. On 18s single yarns, prices run from 29 to 30c., with 30s at 34 to 35c., although several spinners are quoting up to 39c. In two-ply yarns, 40s run from 42 to 44c., with 50s at 51 to 52c.; 60s from 58 to 60c. Advances are reported in Egyptian yarns, with consequent hardening in Sea Island yarns, on account of recent submarine activities in the Mediterranean. Many factors look for further strength in combed peeler yarns on account of restricted shipping in that quarter. Mercerized yarns have been in good demand right along, and prices show increased firmness on all sides.

COTTON YARN TRADE NOTES

Several dealers are complaining of delayed deliveries of low-priced contracts in the South, and say it is the same old story of preference given the higher-priced business.

Local deliveries are reported to be in excellent shape, and are taxing the capacity of many of teamsters. One house stated it had the largest delivery last week for a holiday week ever remembered.

Manufacturers have been notified that

AMERICAN SILK SPINNING CO.
SPINNERS AND DYERS SPUN SILK YARNS
For Weaving, Knitting, etc. Cops, Cones, Tubes, Skeins, etc. Also SILK NOILS
ADMIRAL AND WHIPPLE STS. PROVIDENCE, R. I.

Paulson, Linkroum & Co.
COTTON YARNS
87-89 Leonard St., New York
PHILADELPHIA PROVIDENCE UTICA READING CHICAGO

TILLINGHAST-STILES CO. Cotton and Worsted Yarns
JESSE P. EDDY, Treas. PROVIDENCE, R. I.
HERX & EDDY Incorporated Cotton Yarns and Warps
113 WORTH ST., NEW YORK 441 BOURSE BUILDING, PHILADELPHIA

NOVELTY YARNS
In cotton, silk and worsted, in many designs and colors
COTTON WARPS
In gray and all colors, single or any ply, and cable cord
MACHINED—CARDED COTTON—COLORED
INDIAN ORCHARD COMPANY INDIAN ORCHARD, MASS.

MONUMENT MILLS, Housatonic, Mass.
HIGH GRADE COTTON YARNS, White, Colors, Bleached
On Beams, Jack-Spools, Cones, Skeins, and Chain Warps
FAST-BLACKS & COLORS { For Woolen Mills a Specialty } WE SELL DIRECT

THE J. R. MONTGOMERY CO., WINDSOR LOCKS, CONN. Manufacturers of
MERCERIZED COTTON YARNS Give the high Silk-like luster In Knit Goods and Woven Fabrics
NOVELTY YARNS Boucle, Bourette and Spirals in Cotton, Wool Worsted, Mohair and Silk
COTTON WARPS on Beams, Jacks Spools and Tubes in Fancy Twist, Colors and Printed

Solway Dyeing & Textile Co.
PAWTUCKET, R. I.
Dyers, Bleachers and Mercerizers of Cotton Yarns, Warps or Skeins
ABSOLUTELY FAST COLORS

J. J. KENYON MFG. CO., Manufacturers of SILK FINISH TAPES AND BRAIDS
GLAZED AND COLORED YARNS
ON SPOOLS, TUBES, CONES, ETC.
For Manufacturers' Use PAWTUCKET, R. I.

O. S. HAWES & BRO.
FALL RIVER, MASS.
COTTON YARNS ALL FORMS AND NUMBERS

DANA WARP MILLS
WESTBROOK, MAINE
Cotton Yarn and Warps, Carded and Combed
WHITE AND COLORED SINGLE AND PLY SELL DIRECT

H.S.RICH & CO.
COTTON YARNS
160-162 SOUTH WATER ST
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J. B. Jamieson
77 Summer St., Boston
COTTON YARNS
of all descriptions
Correspondence Solicited

COMBED PEELER YARNS
MORO WEBB
COTTON MILLS CO.
GASTONIA, N. C.
50s to 70s
SINGLE 2 and 3 PLY. WARPS, SKEINS, CONES, TUBES. WET or DRY TWIST

PROSPERITY

The New Year opens under most favorable conditions for the Textile Manufacturers of this country.

The Cannon Mills

desire to express its appreciation of the co-operation of the industry in its efforts, in the past, to prepare for this situation, and promises even greater efficiency for 1916.

With its extensive group of mills, equipped with the most modern machinery for the manufacture of every class of high grade *Cotton Yarns*, combined with a comprehensive selling organization, it is in a position to render the best possible service to the needs of the trade.

The recent opening of our Boston Office will enable us to offer the New England trade a more complete and efficient service for the coming year.

We are prepared to co-operate with you in order to take advantage of the business promised during 1916.

"From Spinner Direct to Manufacturer"

CANNON MILLS

PHILADELPHIA, PA.

NEW YORK BOSTON
READING, PA. AMSTERDAM, N. Y.

YARN MARKETS—Continued

the price of soft coal has been advanced 50c. a ton, which will add another item to their increasing cost of production. In addition to this they say the cost of workmen's compensation insurance which will be added to the price of their raw materials, the restrictions of the new Child Labor Law, and other matters will all necessitate their figuring on an increased expense in production which must be covered in their selling prices.

T. C. Gifford, who has been covering New York State trade for Chas. J. Webb & Co., cotton yarn department, has severed his connection with that firm and has become associated with the Wm. Whitman Co., for whom he will cover that territory, succeeding E. G. Young, who has resigned.

E. L. Hicks, who has been covering a part of the Pennsylvania up-State trade for Chas. J. Webb & Co., will be transferred to the New York State territory for that firm.

George S. Carney, who has been connected with the Philadelphia office of the New England Cotton Yarn Co., has become identified with the local office of Wm. Whitman Co., for which he will cover the up-State trade.

As previously announced, the annual meeting and election of the Philadelphia Cotton Yarn Salesmen's Association will be held at the Manufacturers Club, Friday, Jan. 21, at 6 o'clock. The members will be tendered a buffet luncheon by the Association.

PRICES STILL HARDENING

Most Interest Shown in Cotton Yarns for Near Delivery

BOSTON, Jan. 5.—Demand for most varieties of cotton yarns is remarkably well maintained despite the unusual activity of the last four to six weeks, but the majority of buyers are now displaying more anxiety to cover their positive near needs than they are to extend contracts into the summer or fall. This change in sentiment is partially due to recent advances, but more particularly to the fact that it is becoming increasingly difficult to secure most weaving yarns and combed hosiery yarns for near delivery, while the needs of large numbers of buyers have been steadily increasing. The only extremely dull part of the market is on 20s to 30s carded hosiery yarn, although coarser and finer count hosiery yarns are relatively much less active than are combed varieties, and still remain very dull as compared with the status of most weaving yarns.

Medium and fine count combed weaving yarns continue most active and are steadily hardening in price. Eastern fine counts are fast nearing a minimum basis of 65c. for 2-60s combed peeler skeins. Tire cloth yarns are still inquired for and are quoted on a basis of 53 to 55c. for 23s Sea Island and 43 to 45c. for 23s spun from ordinary Egyptian cotton. There is a very fair demand for 20s to 40s carded weaving yarns and some counts have touched higher prices than have previously been reached in the recent advance; for instance, 2-26s Southern skeins are now being held by some spinners at 27 to 27½c. and the bottom that many spinners will accept for 2-40s is 38c.

CHARLOTTE, N. C. Rumors current last year to the effect that A. C. Summerville, president of the Magnolia Mills is contemplating the erection of a new mill of about 18,000 spindles in or near Charlotte, have been revived. The Magnolia Mills manufacture 40s to 80s single hosiery splicing yarns, with an equipment of 6,144 ring spindles.

FOREIGN SERVICE

U. S. Chamber of Commerce to Work for Improved Methods

WASHINGTON, Jan. 5 (*Special*).—The United States Chamber of Commerce has just announced the result of the tenth referendum vote which it has taken on subjects of international importance, the last being a vote upon the report of the committee which recommended the extension and improvement of the Government's foreign commercial service, in which 307 commercial organizations were asked to vote, including the American Chambers of Commerce in Berlin and Milan, 719 votes being cast in favor of the committee's report and 6 against it. This commits the National Chamber of Commerce to work for the strengthening of the consular service in all its branches, for the appointment of a director of the field service, the distribution of American samples and literature, and for greater appropriations for immediate and special investigations.

It is the intention to ask for more commercial attaches to be sent to the more important commercial countries—Italy, Scandinavia, Spain, Austria, Japan and Turkey. It is also intended to support the measure for the appointment of a foreign trade commissioner and commissioners to be appointed for Australia, New Zealand, South Africa, British India, Greece, the Balkan States, East India and Central America.

Special endorsement was given to the matter of promoting commerce in Latin America so that this country may be in a position to hold its own against all comers at the close of the present European war.

The Americanization of the consular service, the elevation of eleven consular agencies to consulates, and the establishment of 15 consulates where none are at present, are also favored.

NEW DEPARTMENT STARTED

S. H. Greene & Sons Announce New Line by Clyde Print Works

The firm of S. H. Greene & Sons has completed plans for starting a new line of work in conjunction with the staple output of the Clyde Print Works. Linings, book slates, crinoline, and a number of special lines of work will be turned out in the new department which is to be in charge of Calvin E. Nix, whose resignation as manager of the Continental Finishing Co.'s plant at Riverpoint, has just become effective.

A part of the dye house has been set aside for the new department, which Foreman Nix expects to have running in about ten days. A number of machines have already been purchased and Mr. Nix is in New York visiting the trade with the New York agent, H. T. Clark, 43 Leonard Street.

Paterson Bleachery Receiver

On application of Albert Comstock, representing the John Agnew Co., an order appointing Charles F. Lynch as receiver of the Paterson (N. J.) bleachery, has been signed by Vice-Chancellor Vivian M. Lewis. A bond for $3,000 was filed by the receiver. The liabilities of the bleachery company are placed at $8,500, and its assets at $10,000. A hearing for the stockholders and creditors has been set for Jan. 10, in the Chancery Chambers at Jersey City. Albert Comstock was appointed attorney for the receiver.

THE CARDINAL MILLS
WEST POINT, MISS.
30s to 40s
CARDED PEELER WEAVING and KNITTING YARNS
Single and Two Ply Cones, Skeins, Tubes, Ball Warps
We Sell Direct Selling Office: GOLDSBORO, N. C.

Crefeld Waste & Batting Co.
SAYLESVILLE, R. I.
Contractors For and Dealers in
COTTON MILL WASTES

1805 MASON MEANS MERIT 1915
WE BLEACH DYE AND MERCERIZE COTTON SKEINS AND WARPS
35,000 Pounds Daily Quilling—Tubing—Coning—Spooling
THE ROBERT D. MASON CO., Pawtucket, R. I.

SAUQUOIT SILK MFG. CO. INSULATING AND BRAIDING SILKS
ORGANZINE, TRAM AND HOSIERY SILKS
Fast Dye Organzines for Woolen Manufacturers a Specialty
Mills: Bethlehem, Pa., Philadelphia, Pa., Scranton, Pa. New York Representative, Wm. Ryle & Co., 225 Fourth Ave.
Philadelphia Office, 4015 Clarissa St., Nicetown
Chicago Office, 206 So. Market St. Boston Representatives, Stelle and Sherman, 52 Chauncy St., Boston

We are Specialists
In Plain and Fancy Warps, Glazed Twine and Fire Hose Cord and in the Dyeing of Cotton Yarns.

Our Cotton Yarns
2s to 30s
Universal Wound
Are the Best That Are Made
Buy of the Mill with a standard reputation
Whittier Mills Co.
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W-A-R-P-S
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Dress Goods and Men's Wear
C. WOLFENDEN
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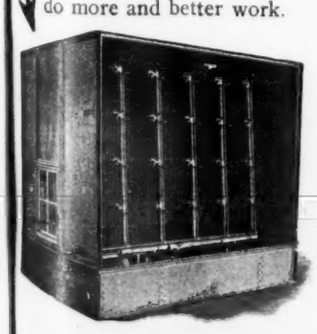
MERCERIZING
DYEING and BLEACHING SKEIN YARNS
WINDING CONES TUBES COPS
GERALD COOPER POMFRET ST PROVIDENCE,R.I.

ORSWELL MILLS FITCHBURG, MASS.
HIGH GRADE
COTTON YARNS
IN CHAIN WARPS, BALL WARPS, SKEINS, ON COPS, CONES AND TUBES
Carded or Combed Single or Twisted

Proper Humidity with Perfect Control
"Sirocco"
TRADE MARK
SYSTEM OF HUMIDIFYING TEXTILE MILLS
are equipped with the Sirocco Humidity Regulator which perfectly controls the humidity—*during all seasons*. The cooling effect produced by Sirocco machines makes it easier for men to do more and better work.



"Sirocco" Spray Heads are practically non-cloggable,
all heads are flushed simultaneously from the *outside*. The heads are adjustable as to density of spray—
Bulletin No. 23,027 gives all details—
Yours upon request.
AMERICAN BLOWER COMPANY
DETROIT, MICHIGAN, U.S.A.

RAW SILK HAS BULLISH TONE IN MANY MARKETS

Advancing Tendency Begun During Holidays Continues—Finished Goods Excellent Outlook

After the holiday in Japan the Yokohama silk market opened strong and cables indicate a continuance of the rising tendency. There seems to be a good demand, which is supporting the market on the higher levels. In the United States alone a large amount of silk is going into consumption and the amount of raw stock to be used seems limited only by the capacity of mills to produce. The holiday period did not bring the usual recession in raw silk prices, because when the market began to go off before Christmas such good demand came to light as to swing the trend around into a bullish one. China silks are stronger this week, particularly those on the Canton market. With silver higher, prices still show a rising tendency. Shanghai is not quite so sure of itself and prices are more settled. The Milan market is a bit irregular and certain high quotations are heard below which most of the trading is being done.

Statistics from Yokohama for last week place sales at about 2,800 bales, and the stock on hand at 14,000 bales. Outside of this the government syndicate holds about 9,000 bales, according to trade estimates. Total exports from Yokohama for the six months ending Dec. 31, are 108,670 bales, of which 86 per cent. was for the United States. Daily arrivals last week averaged 575 bales, generally considered good for this time of the year. A recent estimate of the size of the present crop from a large house in Yokohama is quoted as 175,000 to 180,000 bales.

On the manufacturing end the outlook for the new year is good, and buyers are trying to protect themselves against disappointment in delivery by asking prompt or anticipated shipment. There have been advances of as much as 30 per cent. since the first orders were taken for spring delivery and some manufacturers find difficulty in getting out goods at the original price because of unforeseen conditions. Taffetas continue to be the popular construction. Sheer crepes are in better demand at present than the heavier ones. In instances the price advance at the mill has been so great that the retail price must also be raised, as the difference cannot be absorbed among the distributors.

Below are prices current on raw stock:

European

Grand Extra Classical Piedmont	5.20@5.25
Extra Classical Italian 12/14 to 12/18	5.05@5.10
Best Classical Italian 13/15 to 24/26	4.90@4.95
Classical Italian	4.85@4.90

60 days basis.

Japan

Filature Kansai Double Extra Crack	4.95
Filature Kansai Extra 13/15	4.65
Filature Shinshu Extra 13/15	4.57½
Filature Best No. 1	4.52½
Filature Kansai No. 1 13/15	4.40
Filature Shinshu No. 1 13/15	4.35
Rereels No. 1 13/16	4.57½
Rereels No. 1½ 13/16	4.47½
Rereels No. 1½ to 2	4.40

6 months basis.

China

Canton XXA Crack 14/16	3.75
Canton XXB Ordinary 14/16	3.60
Canton XXB 22/26	3.45
Tsatlee Blue Dragon Flying Horse	3.80@3.85
Tsatlee Kunkee Mars No. 1	3.20@3.25
Tussah Filature 8 cocoons, No. 1-2	1.70

6 months basis.

SPUN SILK

Spun silk reflects the general strength of the market on all silk manufactures. It has been advancing under pressure of demand and the rise in raw stock which has been progressing at the various primary markets lately. Current prices are as follows:

60-2	3.70	30-2	3.35
50-2	3.60	20-2	3.25
40-2	3.50	10-2	3.15

ARTIFICIAL SILK

The situation on artificial silk continues as in the past with domestic production sold far ahead and imports coming in slowly. Many mills which did not cover are still holding out of the market because prices have gone beyond them. Quotations are largely nominal, but the figures below are fairly representative:

150 Deniers English C, Bleached	3.05@3.30
150 Deniers English A, Bleached	3.25@3.50
150 Deniers English B, Bleached	3.15@3.40

New Waste Firm

The American Waste Co., Inc., has been incorporated under the laws of Massachusetts to do a general business in cotton and wool waste. Ira A. Stone, for several years actively identified with the waste business in Boston and recently general manager of the Royal Textile Co., of that city, is president and general manager of the new company. Offices have been opened at 146 Summer Street, Boston.

LUDWIG LITTAUER
THROWN SILK, Tram, Organzine, Artificial Silk

Domestic and Imported, Plain, Gassed and Mercerized, Polished and Glazed Cotton, Mohair Worsted and Tinsel.
YARNS
Best Quality Harness Twine
107-109 Greene St., New York
Silk Throwing Mills, : BEACON and YONKERS, N. Y.

WILLIAM RYLE & CO.
Newton Mills
225 FOURTH AVE. NEW YORK
Thrown and Spun Silk Yarns
for
Silk, Woolen, Worsted, Cotton and Knitting Mills

STEEL CHAIRS
for
Industrial Plants
Finished in maroon baked enamel. Heights carried in stock: 18, 20 and 22 in. high. Write for descriptive matter and prices.

Bernstein Mfg. Co.
34 Street and Allegheny Ave.
Philadelphia, Pa.
No. 860, Weight, 12 ½ lbs.

United States Conditioning & Testing Co.
340 Hudson Street New York, N. Y.
220 Ellison Street Paterson, N. J.
Cotton, Wool and Silk Conditioning, Fabric Testing and Chemical Analyses

Textile Manufacturers

Should be interested in DIAX for the following reasons:

FOR BLEACHING

Purer whites are obtained, less tendency to weaken fibres, saving of time and chemicals.

FOR DYEING

More level dyeings are obtained with economy of dyestuffs. Thorough degumming of previously dyed and finished goods are easily and cheaply performed.

FOR MERCERIZING

Has increased affinity of the cloth for the caustic liquor, gives better lustre, the mercerizing lye kept clearer and lasts longer.

FOR PRINTING

It is especially useful in making adhesive sizes and finishes, and less expensive, and is devoid of color and easily removable.

FOR FINISHING

Thin fluid mixings are produced which penetrate the cloth better, giving superior results in the handle and feel of the cloth, and economy in the use of starch and dextrine.

Further information gladly given. Write

Malt-Diastase Company
79 Wall St., New York City
Laboratories: Brooklyn, N. Y.

Hopkinson Dyeing and Textile Works
MERCERIZERS
Dyers and Bleachers of Skein Yarns. Twines and all Narrow Fabrics. Printers' Knotting Cords a specialty, on tubes or balls (our Fast Black will please you).
T. HOPKINSON, Prop. and Mgr. G. W. HOPKINSON, Supt.
Office and Works, 259 Forest St., Fall River, Mass.

American Water Filters

Are SCIENTIFICALLY designed to meet the exacting conditions of all TEXTILE requirements.

We also install WATER SOFTENERS of any capacity to purify water for every TEXTILE purpose, including the prevention of scale in boilers.

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"A Laborer can Operate the American"

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Sizings and Finishing Products for Cotton, Wool and Silk
All Sulphonated Castor Oils
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PHILADELPHIA PROVIDENCE BOSTON

IRREGULAR ADVANCES

Chemicals Continue On Up-Grade; Future Supplies Uncertain

Prices continue to advance, with stocks growing constantly smaller, according to dealers in the local general chemical market. All agents are being flooded with requests for supplies by mail, telephone and telegraph, and in many cases they are forced to disappoint inquirers. The future is more uncertain now than at any time in the past, and it is unquestionable that the matter of consumers' securing supplies of chemicals is growing more serious every day. A well-informed local factor this week expressed the opinion that those mills which up to this time have been obtaining sufficient quantities to insure full-time operation will shortly be forced to curtail, unless developments at present unforeseen occur. No change is apparent in the situation on cyanide of soda, and negotiations for its safe passage from Rotterdam are still pending. Among the strongest commodities on the market are bleach and oil of vitriol. Spot bleach, according to good authority, is bringing practically whatever the fortunate holder asks for it, with as high as 15c. heard. Bichromates continue a feature, soda being quoted at 25c. and potash at 45 to 47c. Chlorate of soda is irregularly priced, from 47 to 55c. being heard, with 52c. probably the market; yellow prussiate of soda was at 73c. at mid-week.

The situation on the logwood embargo remains unchanged, so far as is apparent, no definite action toward repeal having been taken by Great Britain, despite numerous reports that this is to be done at an early date. Speculators and "scalpers" continue to obtain all kinds of exorbitant prices, if reports of their transactions are to be believed; but it is as true now as at any time since the imposition of the embargo that supplies are being distributed by reputable dealers at considerably below many of the prices heard.

CALENDAR

Edward Jefferson & Brother, importers and dealers of worsted machinery, Philadelphia, have presented their friends in the trade with their daily wall calendar, which is appreciated in a busy office.

HELP WANTED

Wanted: Foreman for Finishing Room on Misses Cotton Ribbed Hosiery, production 1500 dozen daily. In the south. State age, experience and salary expected.

Addressing "South," care of TEXTILE WORLD JOURNAL, 377 Broadway, New York.

Wool Scouring Foreman wanted to take charge of the Wool Scouring Department of a large Pullery. State age, experience, salary expected, etc.

Address Box 3474 TEXTILE WORLD JOURNAL, 377 Broadway, New York.

WANTED:

Thoroughly capable man as superintendent for a plant making high-grade men's and ladies' underwear in cotton and worsteds. Must have had experience in mill management and processing of wool and worsted goods.

Address Box 3487 TEXTILE WORLD JOURNAL, 377 Broadway, New York.

WANTED, a capable man for new mill to manufacture cotton bath and huck towels. Must understand looms and jacquard machinery thoroughly.

Address Box 3479, TEXTILE WORLD JOURNAL 377 Broadway, New York.

COTTON Buying and Receiving Agent Wants Position with large cotton manufacturing concern. 9 years with New England broker; 5 years as a classer in the South; 6 years in present position as Southern receiving agent for a New England cotton merchant. 36 years old; married. References furnished on request.

Address Cotton Agent, 3482, TEXTILE WORLD JOURNAL, 377 Broadway, New York.

Manager or Superintendent

Position wanted by a reliable man with twenty-eight (28) years' experience in all departments of full-fashioned and seamless hosiery manufacturing. Have successfully managed some of the largest mills for the past twenty years and am qualified to take full charge of any size mill. Best references.

Address Box 3485 TEXTILE WORLD JOURNAL, 377 Broadway, New York City.

Situations Wanted

Manufacturers who are in need of superintendents or overseers for any department of mill work may learn of suitable men upon application by mail or telephone to C. T. DONLEVY, care TEXTILE WORLD JOURNAL, 144 Congress St., Boston, who will give prompt attention to their requirements without charge.

ASSISTANT SUPERINTENDENT OF WOOLEN MILL; would consider position as overseer of weaving; has worked on worsted, woolens and cotton worsteds; familiar with all makes of woolen machinery; 31 years of age; will not go South, West, or to Canada; good reference.
6607, Textile World Journal, Boston, Mass.

BOSS SPINNER IN WORSTED MILL; has worked on mohair, cashmere, alpaca and worsteds; familiar with all makes of spoolers, twisters, etc.; 44 years of age, English; will not go to N. H., Vt., Pa., N. Y., N. J., West, South or Canada; good reference.
6608, Textile World Journal, Boston, Mass.

SECOND HAND IN CARD ROOM IN WOOLEN MILL; has worked on all classes of woolen goods, also cotton and shoddy and silk noils; familiar with all makes of woolen machinery; 33 years of age; will not go to Vt., South, or to Canada; good reference.
6609, Textile World Journal, Boston, Mass.

SUPERINTENDENT OF WOOLEN MILL; has worked on fancy woolen and uniform cloths; familiar with all makes of woolen machinery; 32 years of age, married, American; good reference.
6610, Textile World Journal, Boston, Mass.

FINISHER OF WOOLENS AND WORSTEDS; dry and wet, graduate of German Textile Schools; familiar with American, French and German machinery; 32 years of age, married; Eastern States; good references.
6611, Textile World Journal, Boston, Mass.

OVERSEER OF WORSTED DRAWING AND SPINNING; has worked on mohair, camel hair, alpaca and silk mixtures; familiar with English and American makes of machinery; will not go West, South or to Canada; good reference.
6612, Textile World Journal, Boston, Mass.

ASSISTANT DESIGNER IN COTTON MILL; would consider positon in mill office; has worked on fancy cottons, shirtings, dress goods, curtains, fancy lenos and jacquard patterns for blankets; familiar with Crompton & Knowles, Whitin and Draper machinery; will not go West or to Canada; good reference.
6613, Textile World Journal, Boston, Mass.

OVERSEER OF WEAVING IN SILK MILL; has worked on all classes of goods and familiar with all makes of machinery used in the manufacture of silk; 45 years of age, married; will not go to Canada; good reference.
6614, Textile World Journal, Boston, Mass.

OVERSEER OF WOOLEN WEAVING; has worked on all classes of fancy woolens; familiar with Crompton & Knowles machinery; 43 years of age, married; will not go to Pa., N. Y., N. J., West, South or to Canada; good reference.
6615, Textile World Journal, Boston, Mass.

BOSS DYER OR SECOND HAND in woolen or worsted piece dye house; has worked on cross dyes, chrome bottom, chromate, after-chrome, acid dyes, etc.; familiar with piece dye kettles and all kinds of machinery used in finishing room; 27 years of age; will not go South, West or to Canada; good reference.
6616, Textile World Journal, Boston, Mass.

SUPERINTENDENT AND DESIGNER IN WOOLEN MILL; has worked on woolens, worsteds and cotton mixes; familiar with all kinds of machinery; 34 years of age, Scotch; will go anywhere; good reference.
6617, Textile World Journal, Boston, Mass.

OVERSEER OF RING SPINNING TWISTING, WINDING OR SPOOLING has worked on hemp, bag stock, sheeting and Egyptian; familiar with various makes of winders, twisters and spoolers; 24 years of age American; will not go to Canada; good reference.
6618, Textile World Journal, Boston, Mass.

SUPERINTENDENT AND DESIGNER IN WOOLEN MILL; has worked on woolens and worsteds, men's wear and dress goods; familiar with all makes machinery; English; good reference.
6619, Textile World Journal, Boston, Mass.

ASSISTANT WORSTED YARN SUPERINTENDENT; would consider position as salesman or office assistant; 42 years of age, English; good reference.
6620, Textile World Journal, Boston, Mass.

BUSINESS OPPORTUNITIES

AGENCY WANTED

Large Hosiery Mills for England. Experienced salesman residing in London.

Address NELSON, care of STERN & STERN, 79 Fifth Avenue, N. Y. City.

FINANCIAL MAN

By an Eastern Mill, established for several years and manufacturing a staple line of cashmere and merino hose and half hose and properly equipped for turning out a much larger out-put, a party with capital to take charge of financial end.

All communications treated strictly confidential.

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White and Colored Garnetted Silk Stocks and Artificial Silks for woolen goods manufacturers; somewhat expensive, but will enhance the appearance and sales of your fabrics. Samples upon application.

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WANTED AND FOR SALE

WANTED--Two Indigo Grinding Machines

Mention Maker's Name, Capacity and Quote Prices

Address O'Malley Adv. & Selling Co., Suite 1036, Old South Bldg., Boston, Mass.

FOR SALE, TWISTER

J. B. Farrar, ring twister, with spindle brakes, 82 spindles on one side, 2½ inch ring, 3½ inch pitch, 5 inch traverse, tape driven, practically new.

A. T. SKERRY CO., 257 Fourth Avenue, New York City.

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Second-hand Knowles Looms

66 to 72 inch reed space.

16 to 20 harness, 4 x 4 box.

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For Sale

One Kenyon Cloth Dryer, 72 in. wide—50 feet long

EDWARD JEFFERSON & BROTHER
123 So. 2nd Street, Philadelphia, Pa.

Open to buy 15 or 20 Wildman 3¾ in. 24 ga. 2 feed Ribbers.

136 and 168 needle with stop motions preferred. Might consider other good make—must be in first-class order and at low price.

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WANTED AND FOR SALE

FOR SALE

3—Kenyon Chinchilla Machines., 60″
1—P. & W. Napper, 68″
1—D. & F. Napper, 90″
3—Greene Nappers, 80″
2—Smith Garnett Machines, 60″
9—Payne Skein Spoolers 40 spindle
1—P. & W. Folder, Winder and Measurer
14—Mason Looms, 54″ 16 Har., 1x1 box

WANTED

4 or 5—C. & M. Knit Goods Nappers, 66″

NATIONAL MACHINERY CO.
11 Eddy St. Providence, R. I.

WANTED AT ONCE

11 Crompton & Knowles Looms

92″, 4 x 4 box, 25 harness. Must be in good condition. State where can be seen and price.

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4 sets of Jas. Smith 60″x48″ Cards, New Bramwells, Apperlys, Barker Rubs. New Clothing on Top Work. All A No. 1 Condition.

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3 Set Woolen Yarn Mill.

Located in Otter River, Mass., on main line Boston & Maine R. R. Equipment for picking, carding, spinning and spooling. Tenements and farm.

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FOR SALE.

18 48″ x 48″ Cleveland cards, latest type.
6 60″ x 48″ Cleveland cards, latest type.
2 Schofield automatic willows.
2 Smith & Furbush 60″ x 84″ Blamire lap feeds.
1 Complete equipment for cotton dusting.
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A number of different shoddy pickers; also many other desirable textile machines.

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PRESSES { 1 Crawford / 1 Spencer and Rideout

Screw Steam

Each 11 Plates 32″x 51″. Guaranteed Perfect Condition.

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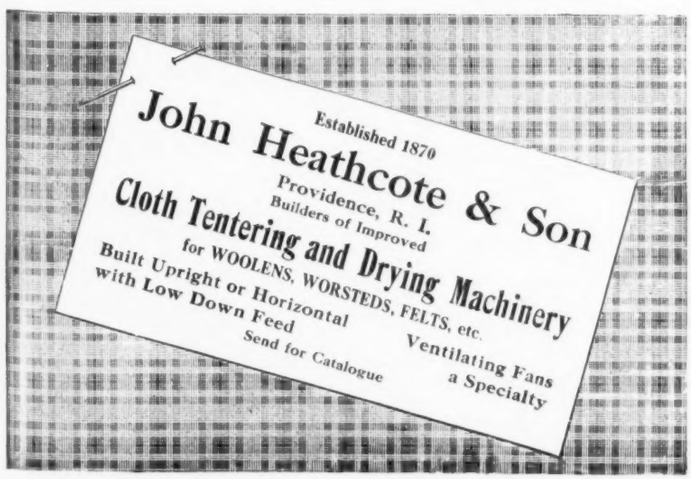
FOR SALE

One Heathcote Twentieth Century Dryer.

A-1 condition. One P. & W. single shear, first-class condition, ledger and revolver practically new.

Phone Lawrence 747, or address Drawer 1, Methuen, Mass.



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The Board of Directors of The United States Finishing Company has approved the decision to make dispersal at unrestricted and unprotected public sale of the entire possessions of the company in Passaic, New Jersey. All the manufacturing operations of the company have recently been consolidated within the five Rhode Island and Connecticut plants. A fully rented and excellently paying single parcel of manufacturing and business and investment real estate of broad dimensions—including solid and heavily constructed good looking two-story brick building, in an important location, with exceptional prospects, bounded by open streets on all sides, possessed of an independent railroad spur track, known as the "Passaic Street Property" of the company, in a direct line on a principal thoroughfare between the two closely connected business sections of the city—and one if not both of these business sections have already reached it, selects its tenants and the income is nearly $5000 *net* per year. The extensive Passaic plant of The United States Finishing Company is in the midst of the important and diversified Dundee Manufacturing Section, has substantial brick buildings on the Dundee Canal, naturally separates into three worthy industrial or textile homes, are free from all trace of former use, are of widely contrasting values, are protected sites, each has either valuable water power right or valuable manufacturing water privilege (or both), an interest in a tide water river dock and in a railroad spur track, are known as the "Canal Street Properties" of the company, each is adaptable to a wide variety of uses and ready for immediate occupancy. The multiplicity of steam engines, boilers, pumps, air compressor, together with six hundred lots of machinery, mechanical equipment, shafting, et cetera, are to be offered in lots to suit purchasers. Everything is to be sold free from encumbrance upon favorable terms and pledged to the highest bona fide bidders at absolute auction sale—who comply with the Terms and Conditions of Sale. The properties are within forty minutes by express trains of downtown New York City. The sale will take place upon or near the respective premises regardless of any condition of the weather, commencing promptly at fifteen minutes past ten o'clock in the forenoon of Thursday, the twentieth day of January, nineteen hundred and sixteen, with the four mentioned parcels of real estate. The above is a very brief outline; but the properties—real and personal—are classified and set forth in detail in an illustrated and descriptive catalogue—including much other correlated information—which may be had upon application at the office of the auctioneers, where all inquiries must be made.

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Worsted Machinery For Sale

1—3 Cylinder & breast 48″ Garnett Machine.
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1—4 Spindle Drawing Box.
3—6 Spindle Drawing Boxes.
1—12 Spindle Drawing Box.
2—16 Spindle Reducers.
5—24 Spindle Reducers.
2—24 Spindle Rovers.
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ALL IN EXCELLENT CONDITION.

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For Sale Cheap for Quick Removal

2 Gill Boxes - Double Cans
3 Two Spindle Gill Boxes 14 x 9 Bobbins
3 Two Spindle Drawing Frames 14 x 9 Bobbins
2 Four Spindle Weigh Boxes 12 x 7 Bobbins
1 Six Spindle Drawing Frame 10 x 6 Bobbins
2 Eight Spindle Finishers 9 x 5 or 10 x 6 Bobbins
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And 21 Roving Frames

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Up-to-date 4 Set Woolen Mill in New England State.

Can make all kinds of Fancy Wool Goods. First Class Overseers and Help. Correspondence Solicited.

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Seven sets of Cleveland Cards, 40″ face, 48″ diameter.

Six Davis & Furber 400-spindle Mules, 1¾″ gauge.

Two Parks & Woolson double cylinder Brushes, cylinders 69x30″.

Two Curtis & Marble double cylinder Gigs, cylinders 72x26″.

Two Broadbent 60″ Extractors.

One Sturtevant direct-connected Engine and Blower.

By AMERICAN MACHINERY EXCHANGE
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Four Tompkins 2-cylinder Tables. Cylinders 17″-18″-19″-20″-21″, all set up, four Feeds, for Fleece underwear. Either 20-22-26 Gauge.
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Eight Campbell & Clute Tables. 2-3-4 Cylinders. Cylinders 8″ to 21″. Gauge 14-16-18-20-22-24-26-28 as desired.
Seven Nye & Tredick Machines, 18″-19″-20″-21″. All 8 feeds, all 7 cut, all Crawford stop motions.
Three Nye & Tredick Machines, 12″-17″ and 18″. All 8 cut, 8 feed, with stop motions.
Two Nye & Tredick Machines, 11″ and 20″. Both 10 cut, 8 feed, with stop motions.
One Stafford & Holt 10″ Toque Machine, cut 4 to inch.
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Four 4¼″ Nye & Tredick Cuff Machines, 2 feeds. Crawford stop motions. Cut 6-8 to inch.
One George W. Payne 40-spindle Skein Winder, new variable speed motion, winds on Bottle Bobbin.
Five Hosiery Winders, Payne, Abel, Huse. 24-40 spindles. All from cop to Bottle Bobbin.
Three McCreary Brushers, 2 Garment Cylinders, 7″ x 56″. One double Brush 36″ cylinders for brushing in roll.

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20 110″ D. & F. looms, 3 x 1 box.
20 92″ Knowles looms, 4 x 4 box, 25 harness.
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1 72″ D. & F. warp dresser, complete.
5 16-spindle Foster cone winders.
1 36″ S. & U. engine-driven extractor.
1 S. & U. engine extractor, 42-inch.

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TO BE SOLD WITHOUT RESERVE

A LARGE LOT OF COTTON, WOOLEN and WORSTED MACHINERY, such as Pickers, all kinds of Woolen and Worsted Cards, 10 sets of Woolen Cards, Mules, Spinning Frames, Worsted Drawing Frames, Noble Combs, Gill Boxes, Dandy Rovers, Ring Twisters, Trap Twisters, Sewing Machines, Knowles Looms, Finishing and Dyeing Machinery; in fact most everything that is used in Cotton, Woolen and Worsted mills.

Correspondence Solicited

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IN SKEIN AND WARP

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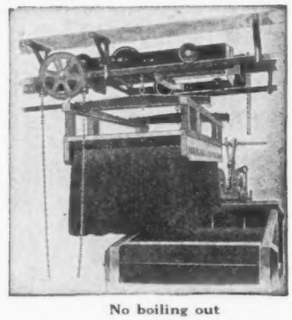

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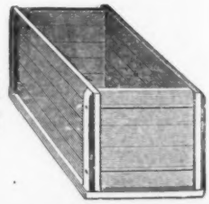

RAW MATERIAL MARKETS (COTTON)—SPOT AND FUTURES

LIVERPOOL'S STRENGTH FEATURE IN RAW COTTON

No Aggressive Demand in New York Futures—Exporters Buy More Freely in South

The attention of the cotton trade has been more or less monopolized by the situation in Liverpool during the week. At the beginning of this season, the stock of American cotton at Liverpool was 1,198,000 bales, while Manchester held 72,000 bales, a total of 1,270,000. At the close of business last week the stock at Liverpool was only 588,000 bales of American, while Manchester held 57,000 bales or a total of 645,000 bales, showing that the small exports from this country had resulted in a reduction of fully 625,000 bales in the British stocks. With much of the cotton held in Liverpool already earmarked for spinners, this reduction in the available supply, combined with the difficulties of replenishment, has evidently been a growing cause of uneasiness. This week, indeed, Liverpool has shown a strength suggesting an urgent need of increased importations, and the difference between Liverpool and the American markets has widened materially to meet the present abnormal costs of transportation. January-February contracts in Liverpool, for instance, have sold 400 points above January in New York, and there has also been a big widening in the differences between later deliveries. This strength abroad has not inspired any material volume of general demand in the American markets. Liverpool has been a heavy buyer here to undo straddles, but otherwise support has been limited and advances have been moderate.

LOW GRADES APPRECIATING

Aside from the developments abroad, there appears to be no material change in the situation. So far as can be learned spot holders in the South are maintaining their position, and the most interesting feature of the spot situation has been the tendency toward smaller discounts on the low grades. It seems that the extraordinary demand for linters for the manufacture of explosives, and the extremely high prices they have commanded have forced some of the ordinary users of linters in the market for low-grade cotton, while there has also been a relatively better demand for low grades from abroad as such cottons can be used readily in the manufacture of army supplies. These changes in the differences between grades will be found reflected in the regular table printed herewith showing the average differences as compiled from the quotations received by the New York Cotton Exchange from the designated spot markets. Meanwhile, there has been no improvement in the ocean freight situation. A rate of $2.50 has been paid on cotton from New York to Manchester, while the prevailing rate from Galveston to Liverpool is $2.60 and from New Orleans to Liverpool the rate is $3 per hundred and it is figured that it must cost nearly 5c per pound to lay down cotton from the Southwest at Liverpool under the prevailing conditions. Spot cotton in Liverpool is now selling at about 16¾c. per pound comparing with the middling quotation of 12c. at New Orleans and 12¼c. at Savannah.

BASIS FOR BEARISH VIEWS

Such prices as these must tend to promote the greatest possible economy in the use of cotton abroad, and it is also evident that Great Britain is reaching the point where certain industries must be sacrificed to the prosecution of the war. According to cables received here from London, the industries to be favored in the matter of enlistments or the army do not include the cotton trade, and it is also reported that the commandeering of vessels by the British Admirality is for other purposes than for the transportation of cotton. Under such circumstances as to exports, the conviction is growing that heavy available supplies must be again carried forward in this country, and the prevailing rather bearish average in local circles is based upon doubt as to whether this will be done at prices well over the cost of production should the acreage be increased and new crop prospects develop favorably. The following table will show Thursday's closing figures in the leading spot markets of the country with the usual comparisons:

	Dec. 30.	Jan. 6.	Change.	Last year.	Sales.
Market.					
Galveston...	12.25	12.45	+.20	7¾	1,851
New Orleans	11.75	12.00	+.25	7⅝	12,025
Mobile.....	11.69	11.88	+.19	7⅝	350
Savannah...	12.00	12¼	+¼	7¾	5,549
Norfolk.....	11.75	12.00	+.25	7⅝	4.313
New York ..	12.30	12.45	+.15	8.00	1,450
Augusta....	11.69	12.00	+.31	7⅞	7,557
Memphis....	12.12	12.38	+.26	7⅝	20,950
St. Louis....	12¼	12¼	....	7⅝	29
Houston....	12.20	12.40	+.20	7⅞	10,809

In addition to the quotations above, the following quotations for middling cotton and the differences on and off are given as compiled from the reports received by the New York Cotton Exchange late on Wednesday for various grades from four representative southern markets, and the average differences as compiled from the quotations of the 12 designated markets:

	Dallas.	Mem-phis.	Mont-gomery.	Au-gusta.	Aver-age.
White Grades.					
M. F.....	1.00†	1.12†	1.00†	.75†	1.03†
S. G. M....	.75†	.62†	.75†	.63†	.74†
G. M.....	.50†	.37†	.50†	.50†	.49†
S. M.....	.25†	.12†	.25†	.25†	.24†
Middling ...12.00	12.38	11.81	12.13	....	
S. L. M....	.38*	.25*	.50*	.38*	.38*
L. M.....	1.00*	.63*	1.00*	.75*	.87*
S. G. O....	1.75*	1.13*	1.50*	1.25*	1.42*
G. O.....	2.50*	1.63*	1.88*	1.75*	1.98*
Yellow Tinged.					
S. G. M....	...	...	.25†	.25†	.28†
G. M.....	....	.12†	Even.	...	.04†
S. M.....	.13*	.13*	.25*	Even.	.19*
Middling ..	.50*	.25*	.50*	.38*	.46*
S. L. M....	1.25*	.63*	1.00*	1.00*	.92*
L. M.....	1.75*	.88*	1.50*	2.00*	1.46*
Blue Tinged.					
Middling ..	1.00*	1.25*	.75*	...	.81*
S. L. M....	1.50*	1.50*	1.25*	...	1.20*
L. M.....	2.00*	1.75*	1.75*	2.00*	1.71*
Stained.					
Middling ..	1.00*	.38*	1.25*	1.25*	1.02*

* Off. † On.

COTTON TRADE NOTES

In their latest circular Neill Bros. of London estimate the world's consumption of American cotton for the season at 14,250,000 bales. The estimate in detail compared with their preliminary estimate of last October follows:

	December Estimate.	October Estimate.
Great Britain.....	3,650,000	3,900,000
Continent	3,300,000	3,500,000
U. S. and Canada....	6,850,000	6,950,000
Japan	450,000	650,000
Total.....	14,250,000	15,000,000

About a year ago Germany was willing to pay 16c. a pound for cotton. Today Liverpool is paying above 16c. for cotton, and the price of cotton in Germany has gone over 40c. a pound.

War risk underwriters have advanced the rate to Mediterranean and Far East ports via the Suez Canal, either going or coming, to 10 per cent per $100 insurance.

According to ocean freight brokers, freight room for between 10,000 and 20,000 bales of cotton from New York to Liverpool and Manchester has been engaged during the past few days at a rate of from $2.25 to $2.50 per 100 lbs.

Liverpool: "The freight question is becoming more and more acute but this unfortunately is not new; cables from India as well as America now emphasize the extreme difficulty of obtaining freight room at any price. The necessary tonnage is not available no matter what price shippers are willing to pay, and it is apparently useless looking forward as the recent commandeering of ships shows that forward contracts are worthless if the boats are required for Government purposes."

Memphis says the discount on grades below middling has never been so small as at present, and the demand from abroad is chiefly for these grades. The low grades enter largely into the manufacture of war goods, for which they are just as satisfactory as white cotton.

A motion has been filed in the Supreme Court to advance the case of the New York cotton brokers who are seeking to have the Supreme Court affirm the decision of the Federal Court in New York declaring the cotton futures act to be unconstitutional. It is expected that the Government will join in the motion.

Renskorf, Lyon & Co. have received the following cable from Bombay: "We confirm Indian Government estimate of 3,700,000 bales of 400 lbs. each. Bombay is carrying over 700,000 bales; interior carrying 900,000. Exports to Europe to date 97,000 against 100,000 last year; probable for season 450,000. China and Japan to date have taken 442,000 against 220,000 last year; probably for season, 2,100,000 against 1,750,000 last year. Local consumption, 2,250,000. Japan is a keen buyer. Europe is indifferent. Statistical position strong. Ralli Bros. have reducted their estimate."

Secretary of Agriculture Houston has issued a warning to American farmers to conserve their fertilizer supply. The Secretary points out that the European war has cut off all importations of potash and before American capital can be organized to produce sufficient potash for the fertilizer trade this year's crops will be planted and harvested.

STATISTICAL DATA

FLUCTUATIONS OF FUTURES.

Option.	Closed Dec. 31.	For week—High.	Low.	Closed Jan. 6.	Chge.
Jan	12.23	12.35	12.04	12.25	+.02
Feb.	12.34	....	....	12.35	+.01
March	12.48	12.61	12.30	12.50	+.02
April	12.58	12.66	12.66	12.60	+.02
May	12.69	12.83	12.54	12.73	+.04
June	12.75	12.87	12.86	12.79	+.04
July	12.86	12.98	12.73	12.89	+.03
Aug.	12.77	12.86	12.77	12.81	+.04
Sept.	12.47	12.62	12.33	12.52	+.05
Oct.	12.47	12.63	12.43	12.54	+.07
Dec.	....	12.69	12.60	12.64	....

SPOT FLUCTUATIONS FOR WEEK (MIDDLING).

	New York.	New Orleans.	Liver-pool.
Friday, Dec. 31.....	12.40c.	11.88c.	7.92d.
Saturday, Jan. 1.....	...	...	...
Monday, Jan. 3.....	12.40c.	11.88c.	8.01d.
Tuesday, Jan. 4.....	12.40c.	11.94c.	8.12d.
Wednesday, Jan. 5....	12.45c.	12c.	8.28d.
Thursday, Jan. 6.....	12.45c.	12c.	8.35d.

SPOT QUOTATIONS AND STOCKS.

	Spot prices.	Stocks. This week.	Stocks. Last year.
Galveston	12.45c.	399,330	501,347
New Orleans.....	12c.	427,317	348,737
Mobile	11.88c.	33,771	57,254
Savannah	12¼c.	212,298	312,625
Charleston	12c.	105,406	135,951
Wilmington	11⅝c.	41,896	38,733
Norfolk	12c.	131,139	69,964
Baltimore	12¼c.	5,163	6,463
Augusta	12c.	207,161	153,138
Memphis	12.38c.	294,817	264,014
St. Louis.....	12¼c.	16,251	34,179
Houston	12.40c.	225,981	186,836
Little Rock.....	12.13c.	40,979	56,771

COMPARATIVE CROP STATISTICS.

	1915.	1914.
Receipts for week.....	128,932	314,953
Receipts for season.....	4,298,023	4,720,821
Exports for season:		
To Great Britain.....	1,018,020	1,787,461
To France.....	390,275	159,797
To Continent.....	809,256	1,046,439
To Japan.....	146,951	242,161
To Mexico.....	15,672	25,508

*DOTHAN, ALA. H. C. Pilcher, recently reported as considering the establishment of a small hosiery mill to be equipped with three or four knitting machines, advises that the project has been dropped for the present.

QUOTATIONS

Cotton Waste—Mill Run.
(See Note.)

	Per cent.
No. 1 peeler comber.....	80 @82½
Short peeler comber.....	— @77½
No. 1 Egyptian comber.....	— @75
Short Egyptian comber.....	— @72½
White card strip.....	— @70
No. 2 White card strip.....	— @40
	Cents.
Dirty card fly.....	1 @ 2
Dirty picked motes.....	— @ 1
Card and spinning sweeps.....	1 @ 1½
Weave sweeps.....	— @ 1½
Soft white threads.....	7½ @ 8
Hard white threads.....	7 @ 7¼
Soft colored threads.....	— @ 6
Hard colored threads.....	— @ 5

Cotton Waste—Graded Stock.
(See Note.)

	Per cent.
No. 1 Egyptian comber.....	85 @87½
No. 1 Egyptian strips.....	85 @90
No. 1 white peeler comber.....	87½ @90
No. 1 white peeler strips.....	80 @85
No. 1 white card strips.....	70 @75
No. 2 white card strips.....	45 @65
No. 1 white spinners.....	90 @1 00
	Cents.
No. 1 soiled card.....	6 @ 7
No. 1 oily card.....	4½ @ 6
No. 2 oily card.....	3 @ 4
No. 1 white willowed fly.....	5 @ 7
No. 2 white willowed fly.....	3 @ 4
No. 1 cleaned white picker.....	4 @ 6
No. 2 cleaned white picker.....	2 @ 2½

Linters.

	f.o.b. N. Y.
Texas, clean mill run.....	— @ 7¼
Texas A.....	— @ 8½
Eastern, clean mill run.....	— @ 7¼
Staple linters.....	— @ 8¼

NOTE.—*Percentages based on price of New York Middling Uplands spot cotton for day of shipment.*

FAIR WASTE TRADING

Large Business Possible but Scarcity Restricts Movement

BOSTON, Jan. 5.—When it is possible to supply the demand cotton waste dealers are doing a very good business, but a large movement of stock is restricted by the continued scarcity of desired grades. Inquiry from buyers has been very good and well distributed, but most dealers are capable of accepting only a small amount of the offered business. Prices are firm but unchanged, excepting that in many instances material premiums are obtained. As has been the character of demand since the linter supply was exhausted, manufacturers are seeking low grades, such as thread, willowed fly and picker. The supply of these stocks continues very low, with little new coming into the market, and orders are hard to fill. Prices on these stocks show little change from their advanced figures except that in several instances dealers are securing premiums of from one-half to one cent a pound. Medium qualities are being used by many manufacturers to replenish the scarcity of low grades, but a scarcity of medium also restricts business. Fine grades are quiet and relatively low in price. On the latter dealers are refusing to pay mills the high prices current a year ago when contracts were made, but for the low grades the mills are holding out for strong prices and when the new stock begins to come into the market there is little hope for any material decline from the prevailing high figures.

Print Cloth Market

FALL RIVER, MASS., Jan. 7.—The print cloth market continues to show the effects of a good inquiry. Manufacturers are very slow in accepting offers, contracts for an extended period being refused owing to the wage agitation. Others were found this week prepared to tie up their machinery for six months, something which they were unwilling with positiveness to do a few weeks ago. The explanation for the reversed attitude is contained in the advances of a sixteenth to an eighth of a cent a yard made by buyers anxious to get goods. Orders already placed call for 225,000 pieces of every variety at these figures: 3¼c. for 28-inch 64s; 3⅝c. for 28-inch 64 x 60s; 3½c. for 27-inch 64 x 60s; 3 1-16c. fo 27-inch 56s; 5c. for 38½-inch 64s, and 5¾c. for 39-inch 68 x 72s.

WOOL MARKETS—BOSTON, PHILADELPHIA AND NEW YORK

BETTER DEMAND FOR WOOL FOLLOWS HOLIDAY WEEK

Woolen and Worsted Mills Now Actively Employed—Imported Wool Values Steady

BOSTON, MASS., Jan. 6.—The opening days of the new year brought a better demand for wool from manufacturers, though many of them were still busy with inventories. While the improvement was not great, there was a marked change from Christmas week, which as usual, brought a dull demand for all grades of wool. Members of the wool trade are full of confidence for the future, all factors now operative being of a bullish character. Not the least of these factors is reckoned at the annual stocks of wool as compiled under the auspices of the Boston Wool Trade Association. These were much less than were generally expected, most of the estimates running as high as 85,000,000 to 100,000,000 pounds. Total imports of wool into the port of Boston for the calendar year, 1915, were 247,914,385 pounds, and yet the increase in unsold stocks was only 9,250,989 pounds, indicating that 238,663,396 pounds has been imported direct by the mills or sold to them by the dealers. This was truly an enormous volume of wool to disappear in a single year. To this must be added an absorption of 162,088,546 pounds domestic wool figured on the same basis as the foreign, or a total of 400,751,942 pounds taken out of the Boston market in one year by the woolen and worsted mills of the country. It was known that the mills were exceedingly busy during the last half of 1915, but the figures above quoted give an idea of the magnitude of the business not to be derived from any other source. It is not strange that the report should have been considered bullish by those members of the trade interviewed after its publication. This takes into account also the fact that arrivals of foreign wool continue heavy, and will be even larger in the near future, as a tremendous volume is now on the way to this country from all sources of supply.

SITUATION VERY FIRM

Notwithstanding the quiet tone which prevailed in the local market at the end of the year, due to causes easily explained and entirely normal, there is no lack of strength noted anywhere. Holders of wool here have been trying to get this market up to somewhere the parity of foreign markets, but until very recently this has been a slow process. Importers have been selling lots of wool from day to day at less than their replacement value, and in fact some of the sellers have wool on the way that will cost more laid down in Boston than similar lots are being sold for. These sales show a good profit, and the sellers are more disposed to cash in this profit than to hold for a possible advance later. Wool men seem to have no doubt that all grades of foreign and domestic wool must sell on a higher basis, except in the improbable event of the early termination of the present European war. Both worsted and woolen mills are better employed than ever before in their history, and are consuming vast quantities of wool. This is the foundation for the present optimistic feeling noted everywhere in the market. Demand from the mills for unusual quantities of raw wool at extremely high prices has given strength in the past, and has been and is relied upon to put this market to the level of the other leading markets of the world. There are other strong features in the current situation—notably the small amount of wool left in the country, moderate stocks at seaboard, the probable reimposition of embargo conditions by Great Britain and her Colonies, and the poor average condition of ths season's Australian clip. Latest statistics of the movement of wool in Australia are given by Wenz & Co., as follows, the time covered being from July 1 to Nov. 23:

	Bales.		
	This Season.	1914-15.	1913-14.
Wool offered	288,574	94,421	412,007
Wool sold	271,694	72,025	383,065
Shipped by steamer	308,862	122,963	365,266

IMPORTED VALUES SUSTAINED

Importers say that it is practically impossible to do any business in Australia during the between-sales period. Values, however, remain very strong, and still higher prices are predicted at the later sales. Sydney and Melbourne will not reopen until Jan. 17, with about 250,000 bales remaining available for sale at Sydney and 130,000 bales at Melbourne and Geelong. Brisbane sales will be reopened Jan. 24, with available offerings in that market of about 130,000 bales. Hobart, Tasmania, will have a sale Jan. 12 to 14, when 27,000 bales will be offered, including both merinos and crossbreds. There is a general belief in the Boston trade that the Australian Government will follow the lead of England and refuse to grant licenses for shipments to this country of any grade of Colonial wool. Nothing definite is yet known about the matter. An embargo is also expected to be enforced in the Cape Colony. Conditions in New Zealand are very much mixed. A fortnight ago it was announced that the embargo was in full force again, dating from the 27th of December, but apparently this decision was modified later, as American buyers on the spot are advising their principals to keep on buying, and seem to be confident that they can secure licenses to ship anything that may be bought from now on. Practically two-thirds of the wool bought in the Dominion this season have been shipped, though the wools contracted for on the sheep's back are being discriminated against to some extent. At each sale it is announced that purchases at that sale will be allowed to be shipped. At the Timaru sale, Jan. 5, the market was very strong, 50s to 56s selling at 18¾ pence for wools shrinking 39 per cent. The next sale will be held at Christchurch, Jan. 10, when 22,000 bales will be offered. The Colonial situation has been greatly complicated by the Bradford contention that great quantities are being bought for German account to be stored in the United States until the end of the war, and this feeling has been fostered by some unwise talk on this side. Undoubtedly Bradford top-makers and spinners are greatly concerned over the volume of wool secured by American buyers in all primary markets, and are disposed to blame this activity for forcing up prices.

SOUTH AMERICA ABOUT DONE

Buying is about over in South America as far as Americans are concerned. German buyers have been so eager for wool that they have run prices up to prohibitive figures, and American buyers are generally coming home. Latest quotations from thence are on the basis of 37c. for Buenos Aires Lincolns, 39c. for straight quarters and 42c. for high quarters. In this market, sales of wool on the spot and to arrive continue to be made at 36 to 37c. for Lincolns, 38 to 39c. for straight quarters, and 41 to 42c. for high quarters. Territory wools continue to move moderately, both in the original bags and for graded lots. Among the sales noted for the week have been 300,000 pounds original Utah at 22 to 26c., or 68 to 70c. clean; about 400,000 pounds Territory, various grades, at private terms; 50,000 pounds Wyoming quarter-blood at 65c., 50,000 pounds fine medium Territory at 23c., and 300,000 pounds original Colorado and New Mexico wool at 66 to 67c. clean. Scoured Territories have moved as freely as the somewhat limited stocks permit, the best wools selling at 66 to 68c. for fine and 63 to 65c. for fine medium. Pulled wools have been rather quiet, on the whole, though the worsted mills have been taking some of the choicest Eastern B supers in the grease, on the scoured basis of 67 to 68c. The best brushed Eastern extras are held at 77c., with average fine As at 72 to 75c., A supers at 65 to 68c., and scoured B supers at 63 to 65c. Chicago pullers are still asking 60c. for their best Bs, but without notable result. The range on these wools is 58 to 60c., with Chicago A supers at 60 to 62c. Fleeces are quiet, the only sale noted for the week being 100,000 pounds baby half-blood combing at 31c. Current quotations for Ohio fleeces are 35½ to 36c. for fine washed delaine, 32 to 33c. for XX and above, 31 to 31½c. for fine unwashed delaine, 27 to 28c. for fine unwashed clothing, 35c. for half-blood combing, 37½ to 38c. for three-eighths-blood combing, 37 to 37½c. for quarter-blood combing, 31 to 32c. for half-blood clothing, and 33 to 34c. for three-eighths-blood clothing. Good-sized transfers of Australian wool are noted on the basis of 82 to 85c. for 70s warp wools, 80c. for 66s warp, 75 to 76c. for warp and weft 64s, and 73 to 75c. for top-making wools. Transfers of about 2,000 bales are noted within this range of quotations. Sales are also reported of 200 bales Australian scoured at a range of 50 to 62c., and 250 bales of scoured at 65c., and about 500 bales and bags at 58 to 63c., and up to 68c. for choice wools scoured in this country. About 100,000 pounds Foreign have also changed hands at private terms.

RECEIPTS AND SHIPMENTS

The receipts of domestic wools this week aggregated 1,608,903 pounds and foreign 8,365,424 pounds, as compared with 2,352,184 and 429,979, respectively, for the corresponding week last year. The total receipts of domestic wools since Jan. 1 have been 866,582 pounds and foreign 924,928, making a total of 1,791,510 pounds, as compared with 2,065,064 pounds last year.

The statistics of shipments follow:

	Pounds.
Boston & Maine	1,664,310
Mystic Wharf	323,477
Grand Junction	130,640
Boston & Albany	681,894
New York, New Haven & Hartford	2,023,310
By sea	526,563
Total	5,360,224
Last week	7,977,339
Last year	3,684,220
Since Jan. 1	3,505,224
Same period of 1915	3,178,512

DEMAND CONTINUES

Wools Moving in Fair Volume at Firm Prices

PHILADELPHIA, Jan. 6.—Demand for wools continues with increased firmness shown on all sides. Dealers state the market as a whole occupies a very strong position, and with business developing in the goods market, they have every reason to expect this condition to be maintained from now on. Mills are operating very satisfactorily which must needs require a constant supply of wool to replenish their stocks, and as the markets appear to be lightly supplied, with continued apprehension of further embargoes abroad, there seems to be very little fear in their minds for a decline in values. Dealers will not sacrifice their wools at prices beneath their own ideas of value, and inasmuch as consignments form a very extensive proportion of the supplies here, with owners holding out for top prices, buyers find themselves obliged to meet the situation as it is found in what appears to be a seller's market.

FIRM PRICES PREVAIL

Demand for wools seems to be well distributed over various grades of territory wools. Fleece wools have not been so generally active here as there are not many left to offer. Those remaining are held very firmly with quarter and three-eighths at 36 to 38c., according to condition. Foreign markets show continued strength which stimulates firmness here. Australian wools are high, and the trade is afraid they will soon hear crossbreds have been cut off from further shipment, which will necessarily limit available supply of wools of this grade. In South American markets, British buyers have been very active, while German agents are also reported buying extensively again, preparing to hold these wools out of the market until the end of the war, and this will bring about a general cleaning up of offerings there. Offers of round lots of Montevideo wools are reported by cable at 45¾c., while 4s and 5s B. A. wools are held at 39c. It seems to offer little hope for cheap wools from this source, and apparently buyers are coming to this point of view, inasmuch as dealers report sales of sample bags of various lines, representing good-sized lots. Among sales noted are 125,000 pounds of original and graded territory wools at 25 to 29c.; 100,000 pounds of original and graded territory at 20 to 30c.; 12,000 pounds of fine and fine medium Colorado at 26c.; 8,000 pounds of medium Idaho at 28c.; 4,000 pounds of quarter and three-eighths Colorado at 30c.

PULLED AND SCOURED FIRM

Pulled and scoured wools do not show any particular change. Demand is noted chiefly for wools suitable for combing for worsted mills, with some little call for fine woolen mills. However, the bulk of the interest is for wools showing a good staple, and short wools are not attracting much attention at present. Fine wools are very scarce, as not many of these wools are being produced with medium wools forming the largest part of the production today. Dealers say buyers usually want those grades which are very difficult to secure, and therefore there is a big call for these fine wools. Prices for these wools have been stiffening, and all kinds of prices are reported. There is no speculation going on now, so the market is in a very satisfactory condition from this point of view. One house reports 10,000 pounds of grease pulled, chiefly brushed B at 52c.; other sales include B wools in the grease at 54c., a choice combing pulled in the grease at 57c.; B scoured at 63c., with a fine scoured at 69c. Sales are also rumored over 70c.

NOILS HARDENING

Noils are showing development of interest. Contracts have been made by dealers with several spinners on a basis which means 46 to 47c. for fine noils, 43 to 45c. for three-eighths, and 41 to 43c. for quarterbloods. Many spinners are delaying these contracts as they desire to get the best price possible, and if there is to be any profit made by dealers, noil prices will have to stiffen. Quarter-blood noils are not any too plentiful now, with spinners chiefly engaged on the higher grades of wools, and good noils are very firm.

CARPET WOOLS SCARCE

Carpet wools are showing scattered activity; these mills are having contin-

RAW MATERIAL MARKETS (WOOL)

MOVEMENT OF FOREIGN WOOL FOR THE WEEK

The following details of the movement in foreign wool in pounds and values have been compiled by the TEXTILE WORLD JOURNAL in Boston and Philadelphia. They give the entries and withdrawals for the week ending Jan. 1. Quotations with a recapitulation of the principal grades and a resume of market conditions are also given. Owing to a change in the compilation methods at the New York Custom House, no current figures on imports at New York are available.

Recapitulation of Week's Business Compared with Same Period in 1914.

	1915. Pounds.	1915. Value.	1914. Pounds.	1914. Value.
Entered for consumption:				
District of Massachusetts	5,670,384	$1,823,297	182,492	$37,235
District of New York	.....	.....	144,250	17,363
Philadelphia	97,407	32,304	22,540	5,142
Total	5,767,791	$1,855,601	349,282	$59,740
Withdrawn from bond:				
District of Massachusetts	45,404	$16,875	28,539	.....
Total business for week	5,813,195	$1,872,476	377,821	.....
Previously reported	340,510,022		193,331,701	
Total since Jan 1, 1915	346,323,217		193,709,522	

QUOTATIONS

OHIO, PENNSYLVANIA AND WEST VIRGINIA.

Washed.		Unwashed.	
XX & abv.	.32 @33	Fn. unwshd.	.27 @27½
½ & ⅝ bld.	.40 @41	Unm'r'ble.	.30 @31
Fine del.	.35 @36	Fine del.	.30½ @31½
		½ bld.	— @35
		⅜ bld.	.37 @38
		¼ bld.	.36½ @37

MICHIGAN AND NEW YORK.

Unwashed.		Unwashed.	
Fn. unwshd.	.25 @26	½ bld.	.34 @35
Fine del.	.28 @30	¼ & ⅜ bld.	.36 @37

KENTUCKY AND SIMILAR.

½ bld.	.35 @36	¼ bld.	.37 @38
⅜ bld.	— @38	Braid cbg.	.32 @33

CALIFORNIA (SCOURED BASIS).

Sp'g north'n		S'th, 6 and 8	
fre&12mo.	.67 @68	mos.	.58 @60
Sp. middle		Fall free	.57 @58
countries	.62 @63	Fall defects	.47 @48
S'th, 12mo.	.58 @60	Carbonized	.52 @53

TEXAS (SCOURED BASIS).

Fine 12mo.	.67 @68	Fine fall	.52 @53
Fine 8mo.	.60 @62	Georgia	.34 @35

OREGON (SCOURED BASIS).

Staple, Eastern, No. 1	.72 @73	Cloth, Eastern, No. 1	.68 @70
Staple, Eastern, No. 2	.68 @70	Cloth, Eastern, No. 2	.63 @65

PULLED—EASTERN.

Scoured.		Scoured.	
Fine A	.67 @70	Cbgs, fine	.62 @63
A super	.63 @65	Medium	.55 @57
B super	.62 @63	Coarse	.53 @55
C super	.50 @52		

PULLED (CHICAGO).

Scoured Basis.			
A super	.58 @60	B super	.58 @60

MONTANA, IDAHO AND WYOMING (SCOURED BASIS).

Staple, fine	.73 @75	Fine clothg.	.68 @70
Do, ½ bld.	.70 @72	Fine med.	.66 @67

UTAH (SCOURED BASIS).

Fine	.68 @70	Fine med.	.65 @67

FOREIGN CARPET.

Aleppo:		Khorassian:	
Washed	— @—	1st clip	— @—
Wshd col.	— @—	2d clip	— @—
Angora	— @—	Mongolian:	
Awassi	— @—	Bijsk	— @—
Karadi	— @—	Urga	— @—
Bokhara:		M'n'chur'n	— @—
White	— @—	Scotch blk.,	
Colors	— @—	faced	— @—
China:		Camels hair	
Combing	.21 @22	(Russ'n)	— @—
Wshd cbg.	.27 @28	Servian skin	
Wld. ball	.21 @22	wools	— @—
Willowed	.18 @21	East India:	
Unwld.	.14 @16	Gray	— @—
Cordova	.15 @17	Washed:	
Donskoi:		Vickaneer	— @—
Combing	.28 @30	Joria	— @—
Georgian.		Kandahar	— @—
Autumn	20 @22	Spring	— @—

COLORADO AND NEW MEXICO (SCOURED BASIS).

Fine	.64 @65	No. 3	.53 @55
No. 1	.62 @63	No. 4	.48 @50
No. 2	.57 @58		

NEVADA (SCOURED BASIS).

Fine clothg.	.68 @70	Fine med.	.65 @67

MOHAIR.

Domestic.		Foreign.	
Combing	.30 @33	Turkey	.38 @40
Carding	.23 @27	Cape	.34 @36

FOREIGN CLOTHING AND COMBING.

Australia (scd. basis), Victorian combing:		Montevideo (greasy):	
		Lincoln	.38 @40
70s	.78 @80	¼ bld.	.40 @41
64s	.75 @76	High. do.	.41 @42
60s	.70 @72	⅜ bld.	.44 @45
Sydney combing		½ bld.	.45 @45
70s	.75 @77	Merino	.33 @35
64s	.73 @75	Buenos Ayres:	
60s	.68 @70	x-breds:	
		Lincoln	.35 @36
		¼ bld.	.37 @38
		High	.40 @41
		English&Irish:	
		Shropshire	— @—
		Sussex	— @—
		Irish hogs	— @—

ued trouble on account of colors, and dyeing costs have increased tremendously for many manufacturers. Colored wools are being sought quite a little, but, of course, they are scarce. Conditions in China do not seem to offer much encouragement.

PHILA. WOOL TRADE NOTES

Announcement is made that on Jan. 1, 1916, W. H. Whiting was admitted to the firm of John A. Leslie & Co., 105 Chestnut Street, dealers in pulled wools. Mr. Whiting has been associated with this house for many years, and has made a large circle of friends in the trade, who are glad to congratulate him.

E. J. Owrid, has resigned as representative of M. Sabel & Sons, Louisville, Ky., in this market. He has become connected with the wool department of Chas. J. Webb & Co.

Preparations for the dinner of the Philadelphia Wool & Textile Association, to be held on next Wednesday evening, Jan. 12, at the Manufacturers Club, indicate the gathering will be a momentous occasion. It is expected that over 200 will be present. President A. C. Bigelow and J. D. C. Henderson, Chairman of the Committee, have been working on the various details of the arrangements, and a very interesting program will be presented. Live speakers will address the gathering, and with other entertaining features it is safe to predict a very profitable and enjoyable evening. Inasmuch as this is the first dinner ever given by the Association as such, it will be largely a get-together meeting.

PRICES REMAIN FIRM

Carpet Wools Quiet—Combing and Clothing Wools Moved

NEW YORK, Dec. 7.—There has been comparatively little activity in either division of the market during the week as compared with the early weeks of last month, though a very satisfactory turnover has been accomplished. In the combing and clothing wools the latter have been more favored, particularly the medium grades in both pulled and shorn wools. These have sold in fairly good quantities and there has been a considerable inquiry for Bs from mills specializing in novelty coatings and cloakings. Gray Bs are in rather light supply, the accumulation of such stocks having been absorbed by manufacturers in recent weeks.

In shorn wools inquiry has been turned toward Texas and similar stocks, an indication that broadcloths and face-finished fabrics are to be a factor in the coming season. Scoured wools have not been sold in volume, the trading being in small lots to a large number of customers, the aggregate sales amounting to much less than those of last week.

CARPET WOOLS SLUGGISH

Transactions in carpet wools have been of a rather desultory character, no sales of any magnitude having taken place since the sale of approximately half a million pounds last Friday. None of the larger factors have evidenced any especial interest in either Chinas or East Indias, due, in all probability, to the fact that they were large operators at the last series of Liverpool sales.

It is very difficult to obtain any definite information as to the embargo, conflicting reports coming from both England and Australia. It is not the opinion of the local trade that shipments of wools already purchased will be under embargo, but it is a fact that licenses are granted with much less freedom than formerly. The situation on Chinas is not noticeably changed, the predicted softening in prices not yet materializing. Quotations on all grades are very firmly maintained, the consensus of opinion being that foreign conditions are indicative of a continuance of prices on present levels or slightly higher.

DEFINITIONS OF FLANNEL

(*Continued from page* 11)

monly accepted in the trade, which is quoted verbatim.

"In the men's wear trade a flannel is a woven fabric in either plain or twill weave, made from fairly short staple soft stock wool or largely so—and entirely or with a great proportion of the weight of carded yarns, rather loosely woven, and finished practically in the texture in which it leaves the loom. It is fulled but slightly, but has considerable face with soft handle and appearance due to the kind of stock. This is in contrast to those more fulled and firmer woolen cloths made for general suiting wear known as thibets, meltons, cassimeres, etc."

Mr. Francis was subjected to a severe cross examination, including an examination and classification of a large number of samples representing the various invoices involved in the protests. None of the samples in dispute, according to the witness, could properly be designated as flannels. Other witnesses testifying to the correct classification of the goods in question were J. E. J. Clare, of the Waterloo Woolen Co.; E. M. Stout, of the Coronet Worsted Co., and Carl J. Maas, of Neale, Maas & Co.

The greater portion of the fabrics in dispute might be classified correctly by the veriest novice, having none of the inherent characteristics of a flannel, several of them, in fact, being unfinished worsteds while others are distinctly cassimeres. A portion of the cloths are fancy vestings, some of them well fulled semi-melton effects and still others cotton warp shirtings of very low grade.

Morton G. Baldwin, who for some years has been associated with E. B. Carleton & Co., wool and yarns, Boston, has opened an office at 184 Summer Street, where he will trade in worsted yarns.

Philadelphia Wool Scouring and Carbonizing Co.
WOOL
Scoured and Carbonized
Freight Address: Coral St. Sta., P. & R. RR. Somerset and Tulip Sts., Phila., Pa.

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WOOL SCOURED—CARBONIZED COMBED AND STORED
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FARNSWORTH, STEVENSON & CO.
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WOOLS AND NOILS OF ALL DESCRIPTIONS BOUGHT AND SOLD ON COMMISSION
CONSIGNMENTS SOLICITED
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EXCELLENT WORK Philadelphia and Reading Railroad Siding QUICK DISPATCH
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COMBING AND SCOURING
All Grades of Wool
Entirely on Commission
NORTON - - - - MASS.

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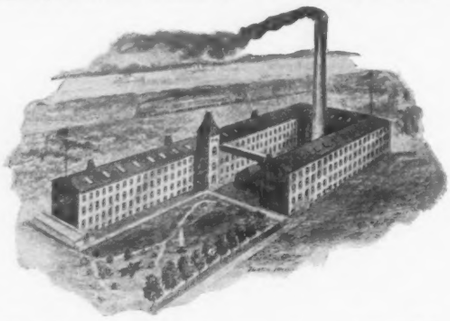
HOWLAND CROFT SONS & CO., Linden Worsted Mills, CAMDEN NEW JERSEY

Represented by FIRTH BROADHEAD, 937 Banigan Bldg., Providence, R. I.



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Gray and in all Colors; also Fancy Mixtures and Doubles and Twists

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MILLS AT BRISTOL, PA.

Philadelphia Office: 108 S. Front Street

WM. H. GRUNDY & CO.

Top Makers and Worsted Spinners

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Men's Wear, Dress Goods and Knitting Trade both in Grey and Mixtures

ALFRED WOLSTENHOLME & SON, INC.

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YARNS

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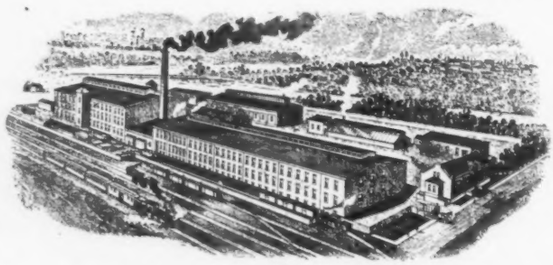

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WHITE NATURAL AND FANCY MIXES IN SINGLE AND PLY FOR KNITTING AND WEAVING

Mill and Office WEST CONSHOHOCKEN, PA.

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SPINNERS OF WORSTED YARNS FANCY MIXES COLORS and GRAY

DELIVERED IN ANY FORM WANTED

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Of Every Description for Knitting and Weaving

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The Pitkin-Holdsworth Worsted Co.

PASSAIC, N. J.

Spinners of Worsted Yarns in the Gray for Weaving and Knitting

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Worsted Yarns

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Bradford System

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JAMES DOAK JR. COMPANY

WORSTED SPINNERS

KENSINGTON PHILADELPHIA

YARNS—WORSTED, WOOL, MERINO

QUOTATIONS

WORSTED YARNS—BRADFORD SYSTEM.			
2-12s to 2-16s low common....	82½	@	85
2-20s to 2-24s low ¼.....	87½	@	90
2-20s to 2-25s ¼ blood.....	87½	@	92½
2-26s to 2-28s ¼ blood.....	90	@	95
2-32s ¼ blood.....	97½	@1	00
2-20s ⅜ blood.....	95	@	97½
2-26s ⅜ blood.....	97½	@1	00
2-28s ½ blood.....1	07½	@1	10
2-32s ⅝ blood.....	97½	@1	02½
2-36s ⅝ blood.....1	02½	@1	05
2-40s ½ blood.....1	12½	@1	15
2-50s 1	20	@1	25
2-40s Australian 70s quality..1	15	@1	17½
2-50s Australian, 70s quality..1	25	@1	27½
2-60s Australian, 70s quality..1	32½	@1	35
2-24s lustre.....	Nominal.		
2-28s lustre.....	—	@	—
2-30s and 3-32s lustre.....	95	@	97½
2-36s lustre.....1	10	@1	12½
FRENCH SPUN YARNS.			
1-20s quarter.....	90	@	92½
1-20s high quarter.....	92½	@	95
1-20s ⅝ blood.....	95	@	97½
1-20s high ⅝.....	97½	@1	00
1-30s ⅝ blood.....1	05	@1	07½
1-20s ½ blood.....1	02½	@1	05
1-30s ½ blood.....1	05	@1	07½
1-40s ½ blood.....1	10	@1	12½
1-50s delaine.....1	15	@1	17½
1-40s Australian.....1	07½	@1	10
1-50s Australian.....1	22½	@1	25
1-60s fine Australian.....1	37½	@1	40
1-70s fine Australian.....1	37½	@1	40
WOOLEN YARNS.			
12 to 16 cut, ¼ blood worsted waste and shoddy.....	62½	@	65
12 to 20 cut, ¼ blood and shoddy (colors).....	67½	@	72½
12 to 20 cut, ¼ blood and noils (white).....	77½	@	82½
11 to 20 cut, ¼ blood and noils (colors).....	72½	@	75
20 to 28 cut, straight, ¼ blood (white).....	80	@	82½
20 to 28 cut, straight, ⅜ blood (white)	95	@	97½
From 20 to 28 cut, add 1c. per cut.			
32 cut, fine white carbonized..	—	@1	00
40 cut, fine white carbonized..1	12½	@1	15
2-12 to 2-18 cut, ¼ blood, worsted waste and shoddy	57½	@	60
2-18 to 2-20 cut, in grease....	67½	@	70
2-18 to 2-20 cut, in colors.....	77½	@	80
2-22 to 2-24 cut, skein dyed in colors	77½	@	80
8 ot 20 cut, blk, wool spn. cotton	22	@	25
MERINO YARNS.			
12 to 16 cut, 50 to 50, wool and shoddy	35	@	37½
12 to 24 cut, 75—25.....	55	@	60
12 to 20 cut, 40—60.....	52½	@	55
28 cut, 50—50, colors and mixes	60	@	62½
42 cut, 50—50, white, mixes and colors.....	70	@	72½
42 cut, 70—30, white, mixes and colors.....	75	@	80
12 to 25 cut, 85—15, ⅝ blood.	80	@	85
KNITTING YARNS IN OIL (WORSTED). BRADFORD SYSTEM.			
Dyed prices nominal.			
2-5s to 2-10s, ¼ blood.....	85	@	87½
2-11s to 2-20s, ¼ blood.....	85½	@	90
2-20s to 2-30s, ¼ blood.....	92	@	95
2-16s to 2-20s, ⅝ blood.....	97½	@1	00
2-18s to 2-24s, ½ blood.....1	05	@1	07½
2-26s to 2-30s, ½ blood.....1	07½	@1	10
WOOLEN KNITTING YARNS.			
Dyed prices nominal.			
Up to 2-15s dyed.....	87½	@	90
2-16s to 2-23s dyed.....	92½	@	95
Up to 2-15s double bleached..	87½	@	90
2-15s to 2-23s double bleached	90	@	92½
Coarser numbers in 10s and lower, 2s. less.			
2-16s to 2-20s cut Oxford....	77½	@	82½
2-21s to 2-23s cut Oxford....	80	@	85
CARPET YARNS.			
Prices are nominal.			
60-yd. double reel, wool filling	—	@	36
No. 2 60-yd. double reel, filling	—	@	33
First quality, ⅝.....	—	@	24
Second quality, ⅝.....	—	@	22
60-yd. double reel cotton filling skein.....	—	@	14
(On cops))....	13½	@	14½
Extra best.....	15½	@	16
Wool Ingrains, 42-yd.:			
Common	8½	@	9
Medium	10½	@	11
Best	14	@	15
Extra best.....	14	@	15
Light supers.....	16	@	17
Super jute, 42-yd.....	—	@	9
Super jute (high), 42-yd.....	9	@	10
Velvet wool, sun, 125-yd, white	—	@	38
Gray	—	@	30
In Worsteds:			
16s 2-ply for ingrains, white	62	@	63
16s 2-ply light gray.....	60	@	61
16s 2-ply dark gray.....	—	@	—
13s 2-3 tapestry.....	66	@	67
16s 2-3 Brussels, white.....	68	@	69
16s 2-3 Brussels, light gray.	66	@	67
JUTE YARNS.			
For carpets and rugs:			
6-lb.....— @15	13-lb. ...10¾ @11¾		
7-lb.....— @14½	14 to 16-lb.11 @11¾		
8-lb.....— @13½	17 to 18-lb.11 @11¾		
9-lb.....— @13¼	19 to 24-lb.11 @11¾		
10-lb.....— @13	25 to 50-lb.10¾ @11½		
11-lb.....— @12½	50 & over..10 @11		
12-lb.....11½ @12			
For plied yarns from 12 lbs. and upward, ½c. and under 14 lbs., 1c.			
Venetian yarn, 11 to 12-lb., 2-ply, gray in skein, 10 cts.; black in skein, 11½ cts.; black in cops, 12 cts.			
For Smyrna Rugs:			
Rolls .....— @11¼			
Cops .....— @12¾			

WORSTED YARNS ACTIVE; DEMAND AT HIGH PRICES

Dress Goods Mills' Late Buying Costs Them Dear—Deliveries Bother Spinners Considerably

Activity continues to mark the worsted yarn market, with increasing firmness in prices. Spinners have recently been notifying their representatives of advances of 2 to 4c. in many instances, in view of the business which had materialized within the last week or two. It appears to be a seller's market, pure and simple; buyers are making efforts to get yarns at right prices, but this is not always such an easy matter. The volume of business already on spinners' books has served to strengthen their price attitude, while developments in a strongly held wool market likewise stimulate their independent attitude. In fact, many dealers say they are not able to accept all of the business that is offered them at present on account of the sold-up condition of their spinners. They expect that these belated buyers will be able eventually to secure their yarns, but they are sure they will have to pay more money for them than if they had taken advantage of the earlier lower market.

NEW BUSINESS CONTINUES

Present conditions show a good volume of new business being offered and placed at prices which were refused as being too high not long ago, but at the same time specifications are coming along in such proportions that they frequently embarrass the mills in making required deliveries. In many cases specifications have been advanced ahead of their schedules, as, for example, those intended for February are being taken in January, and so it runs, to such an extent that dealers have their hands full satisfying the demands of their trade. Dress goods mills are most active buyers now.

OUTLOOK GOOD

Conditions throughout the various branches of the market, point to good business from now on. With the activity developed in the goods market, manufacturers of men's wear fabrics are receiving a good volume of orders. In many cases sales have been made at advanced prices which were raised in an effort to stave off further orders. Buyers seem to be apprehensive that they will be caught without any goods, as stocks of merchandise on all sides are reported at low ebb. With the color situation in such an uncertain state, buyers anticipate in order to be sure of securing satisfactory fabrics. This business naturally has stimulated the yarn market into further activity.

PRICES ADVANCED

High prices are heard on all sides, and spinners predict further advances as business develops. For 2-50s, it is said to be almost impossible to get anything under $1.25, and many want $1.27½; for 2-40s all kinds of prices are heard, depending upon the yarn. For Bradford spun $1.12½ to $1.15 is mostly heard, and it is said sales have been made as high as $1.19, while French spun runs up to $1.20. All numbers are advanced in proportion, and 2-28s half-blood are held around $1.07½ to $1.10. Many mills are unable to consider inquiries for mixtures now; others refuse to do a thing until they have the dyes needed, when they will quote. Oil prices are the only definite point in many contracts. Logwoods are limited in their supply, and have even been exhausted with more than one spinner for their mixtures. Hope is ex-

Pocasset Worsted Company

Worsted Yarns

OFFICE:
100 BOYLSTON ST. :: BOSTON
TEL. 620 OXFORD

NEW JERSEY WORSTED SPINNING CO.
ALL KINDS OF FRENCH SPUN YARNS.
GARFIELD, N.J.

WORSTED YARNS
HIGH GRADE
BRADFORD STEEL SYSTEM
MADE IN AMERICA
WEAVING-KNITTING

In the gray, fancy shades, twists, mixtures, both VIGOUREUX and blends
WARNER J. STEEL
Successor to
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YARN MARKETS—WORSTED—Continued

pressed that domestic dye producers who have promised delivery by February, will be able to relieve the situation. At the same time there seems to be a continual cropping up of dyestuffs at extremely high prices, so that where a mill must have the colors, a small quantity can usually be picked up, but a good round sum is paid for the luxury.

KNITTING YARNS ACTIVE

Knitting yarns seem to show no signs of slowing up. New business, of course, is not so prevalent just now, as most manufacturers have placed their contracts for their early year requirements. There are, however, many small sales being made right along to fill in. Dealers, therefore, state they are chiefly occupied in making deliveries on specifications against contracts, and this usually keeps them busy trying to meet the requirements of their trade. The color situation is still acute, and dyeing prices are continually showing steep advances for such colors as navy, and other dark shades which require a large percentage of dyes. Dyers too are exercising much caution in their efforts to distribute their work so as to take care of all their regular customers, and not confine it to a few. Therefore many dealers say they cannot secure all they need from dyers, and hence cannot do as much business as might be possible. Sweater mills are still receiving business requiring early delivery through the effort of distributors to replace depleted stocks, and this has carried the season well over into the current year. Many dealers say the business done last year was the best they ever had; the year was slow in developing, but when business came it was in such volume, and at such a high price level, that it enabled them to make up for the delay.

QUIET YARN TRADING

Manufacturers Inclined to Await Goods Openings

BOSTON, Jan. 5.—Besides being well covered with yarns for present needs, at least most manufacturers are inclined to await developments in the opening of heavy weights, and these factors combine to restrict yarn trading, resulting in comparatively little business within the past week. New orders are mostly for small amounts that manufacturers need to cover some positive near need, but buyers are finding some difficulty in placing these contracts. Despite the lack of new business practically all spinners are well occupied, and have enough business on their books to cover capacity production for the next few months, and before the lapse of this period the real buying for heavy-weight purposes is expected. The situation throughout the market is really unchanged, and presents a strong condition. Tops and wool values continue firm and high, and spinners must necessarily ask relatively high yarn prices; in fact, spinners are now firmer than they have been for some time, and there are few who will consider below the current asking figures. Half-blood counts are the feature of the present situation, due to the increased demand for these yarns, though three-eighths blood counts are relatively the highest.

The comparative cheapness of half-bloods is causing manufacturers to employ them whenever possible, and recent trading has been largely in their qualities in counts, ranging from 2-28s to 2-40s. Few spinners will now consider below $1.12½ for 2-40s, and the number who are demanding $1.15 is steadily increasing; in fact, almost every spinner who is well sold is holding for the latter price. For 2-28s the low quotation is $1.05, yet there are only a few spinners willing to do business at this price, and most of them want, at least, $1.07½. While three-eighths blood qualities are quoted on a basis of $1.05 for 2-36s, prices are largely nominal and depend upon conditions peculiar to individual transactions. There has been only a slight let-up in the demand for knitting yarns, and many knitters are now placing contracts for deliveries for considerably longer periods than is the usual custom of this branch of the industry. Knitting yarn prices are steadily advancing, and the dyestuff problem is fully as serious as it has been if not more so; spinners continue to evade color difficulties by selling most of their yarns subject to ability to have them dyed and advanced cost of the latter.

TOP MARKET UNCHANGED

Buyers Awaiting Goods Developments

BOSTON, Jan. 5.—Most top users are awaiting developments from the goods markets and are not inclined to place many new orders at present and trading is accordingly restricted. Buying, however, is believed to be only temporarily checked and when the heavy-weight season is really under way a healthy demand for tops is looked for. Meanwhile, combers continue as firm as ever and in most cases are refusing to consider new orders except for a price. It is true that there is considerable variation in individual asking prices but combers with the best quality tops want at least 90c. for fine and half-blood, 85c. for three-eighths-blood and 78c. for quarter-blood and 70c. for low quarter-blood. These are largely asking prices now but when buying is resumed they are expected to be substantiated by actual sales; in fact, there is an opinion expressed by some combers that prices will be even higher before the end of the season.

There is really no change in the noil situation either in demand or prices. There is a fair movement of fine and a good demand for three-eighths-blood with trading in the latter restricted by the small supply of stock. Prices are quoted on a basis of about 45 to 47c. for fine.

TEXTILE PATENTS

(*Continued from page* 15)

this group in substantially the same way as by the first group, being reworked and replaced on the main cylinder in the same manner. There is space between this group and the third group which comprises the rolls 30, 31 and 32 which correspond in pitch of teeth, direction of travel and speed with 20, 21 and 22 and 11, 12 and 13. The fancy, which may be called the main fancy, K corresponds with 23 and 14 but the main doffer H which corresponds with 24 and 15 is out of engagement with the main cylinder whereby the stock S instead of being returned to the main cylinder is removed by the comb L in a well known manner. It will be observed that the speed of the second principal roll increases over the first and it will be noted that the stock is entirely stripped from the main cylinder by each group, that is, at three points, and that when the teeth of the main cylinder engage the teeth of roll 11, they are clear of stock. In this construction, there are carding points between 11 and B, between 12 and 13, 12 and 15, between 20 and B, 21 and 22, and 21 and 24, also between 30 and B, 31 and 32, and 31 and H. This makes nine carding points with nine principal rolls.

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KINKS ON WOOL CARDING

(Continued from page 19)

Cards should have sleeve bearings for workers and strippers, as it is nearly impossible to keep the fibers out of open bearings. On double finisher cards I have always had good results running the doffer backwards, or up over, as it is called. It is a good plan on a double finisher to put a wooden roll or a metal roll between the second breaker cylinder and doffer. This will hold the stock more evenly and make it lie straighter on the doffer.

In regard to the Apperly feed, the writer would recommend the new long diagonal feed, which gives more of an angle and the stock goes in straighter, resulting in stronger yarn. The 20-inch ring doffers with the double apron rub are preferred.

In card clothing the writer prefers for cylinders for first breaker, No. 32 wire filleting; doffer, No. 33 wire; first two breakers, No. 32 wire; the rest of the workers, No. 33 wire; strippers, No. 32 wire; tumbler on first breaker, No. 31 wire; fancy No. 28 wire, open set, low bend.

TWITTY YARN

There are several things that will cause yarn to be twitty, such as low places in fancy, where the wire is a little lower or rigid. Many times rings become hooked and a good way to overcome this difficulty is to run the ring doffers backwards, holding an old hand card against the point. This will take the old point off. Reverse and grind lightly until a nice working point is secured. Sometimes the licker-in may be a little out of true and take stock in flakes or bunches. This can be easily remedied by having the licker-in trued up.

FINE AND HEAVY ENDS

There are a good many things that will cause fine and heavy ends on Apperly feeds. The band roll will sometimes get wound up with stock or waste. This should be watched very carefully, as it causes trouble. Every carder should keep the feed rolls well under observation. He should study the nature of the stock he is about to card to enable him to judge the condition of the roping and to produce the strongest and most even yarn possible. He should never cease in his endeavors to improve and increase the production, to lessen the cost and the amount of waste made.

WOOLEN MILL NEWS

*Clifton Heights, Pa. The new brick addition recently erected for the Caledonia Woolen Mills has been equipped with 38 new looms. They are now operating 188 narrow looms on cotton worsted and cotton and wool mixed goods, with James T. Stewart as superintendent, the production being sold direct.

La Crosse, Wis. The Onalaska Woolen Manufacturing Co. is reported to have changed its name to the Badger Hosiery Co., and to have increased its capital stock to $50,000. Men's seamless hosiery, lumbermen's socks and mittens are manufactured with an equipment at last report consisting of two sets of cards, 31 knitting machines, etc.

Philadelphia, Pa. Application has been made for a charter of incorporation by Robert Carson, John T. Carson and Robert J. Carson, as Robert Carson & Sons, Inc. This is an incorporation of the old firm of Robert Carson & Sons, manufacturers of carpets, East Huntingdon Street and Trenton Avenue.

New York, N.Y. The Kazan Carpet Co., Inc., carpets, rugs, etc., has been incorporated with a capital stock of $1,208,000 by Avramm Kazan, Fernand X. Castelli, and Eugene A. Manning.

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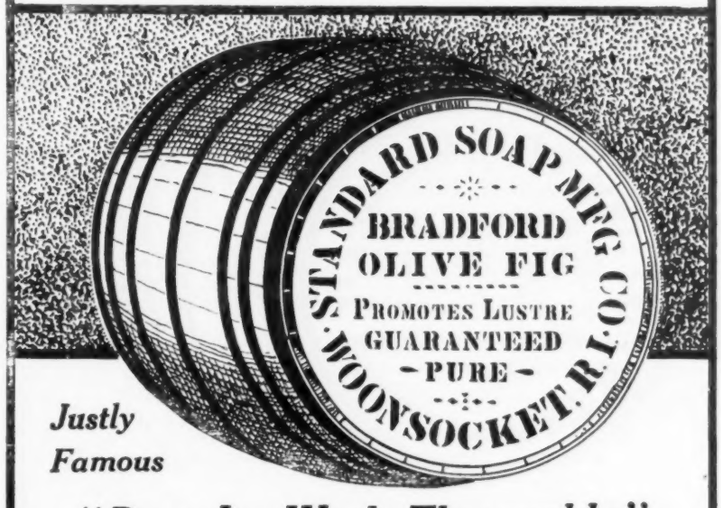

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Concrete Dressing.
Sonneborn, L., Sons, Inc.

Concrete Preserver.
Sonneborn, L., Sons, Inc.

Condensers.
Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
Dodge, C. S.

Conditioning and Testing.
U. S. Conditioning & Testing Co.

Conditioning Machines.
Parks & Woolson Machine Co.
Sargent's Sons Corp., C. G.

Cones (Paper).
American Paper Bobbin Co., Inc.
Pairpoint Corporation.

Construction.
Arnold Co., The.

Contractors.
Ferguson Co., John W.

Conveying Systems.
Buffalo Forge Co.
Hetherington & Sons, J., Ltd.
Hunt Co., C. W., Inc.
Leigh & Butler.
Link-Belt Co.
Sturtevant, B. F., Co.

Conveyor Belting.
Gandy Belting Co.
Link-Belt Co.

Coolers (Air).
Carrier Engineering Co.
Power Specialty Co.

Cop Machinery.
Eppler, John, Machine Works.

Cop Spindles.
American Textile Specialty Co.

Cop Tubes.
Pairpoint Corporation.
——See Paper Tubes.

Copper Expansion Joints.
Badger, E. B., & Sons Co.

Copper Print Rollers.
Taunton-New Bedford Copper Co.

Coppersmiths.
Badger, E. B., & Sons Co.
Butterworth, H. W., & Sons Co.
Textile-Finishing Machinery Co.

Copper Work for Dyers.
Badger, E. B., & Sons Co.
Butterworth, H. W., & Sons Co.
Textile-Finishing Machinery Co.

Corduroy and Velvet Cutting Machines.
Firth, William, Co.

Corrugated Iron and Steel.
Scaife, W. B., & Sons.

Cotton.
Embury & Maury.
Indian Orchard Co.
Schwartz, L. H. A., & Co.
Weld & Co., Stephen M.

Cotton Waste.
Crefeld Waste & Batting Co.

Cotton Dryers.
——See Drying Machinery.

Cotton Machinery.
Ashworth Bros.
Atkinson, Haserick & Co.
Barber-Colman Co.
Butterworth, H. W., & Sons Co.
Cramer, Stuart W.
Crompton & Knowles Loom Wks.
Curtis & Marble Machine Co.
Dixon Lubricating Saddle Co.
Draper Company.
Easton & Burnham Machine Co.
Elliot & Hall.
Entwistle Co., T. C.
Fales & Jenks Machine Co.
Firth, William.
Hetherington & Sons.
Hunter Machine Co.
Klauder-Weldon Dyeing Mach Co.
Leigh & Butler.
Lever Co., Inc., Oswald.
Mason Machine Works.
Metallic Drawing Roll Co., The.
Parks & Woolson Machine Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Potter & Johnston Machine Co.
Saco-Lowell Shops.
Sargent's Sons Corp., C. G.
Schwartz, L. H. A., & Co.
Smith & Furbush Machine Co.
Stafford Co., The.
Tatham, William, Ltd.
Textile-Finishing Machinery Co.
Textile Machinery Co.
Universal Winding Co.
Whitinsville Spinning Ring Co.
Wildman Mfg. Co.
Woonsocket Mach. & Press Co.

Cotton Openers and Lappers.
Atkinson, Haserick & Co.
Firth, William, Co.
Hetherington, John & Sons, Ltd.
Leigh & Butler.
Potter & Johnston Mach. Co.
Saco-Lowell Shops.

Cotton Softeners.
Bosson & Lane.
Harding & Fancourt, Inc.
Seydel Mfg. Co., The.
Wolf, Jacques & Co.

Cotton Waste Machinery.
Firth, William, Co.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Tatham, William, Ltd.

Counting Machines.
Durant Manufacturing Co.
National Scale Co.
Root, C. J., & Co.
Veeder Mfg. Co.

Couplings (Flexible-Insulated).
Bond Co., Charles.

Couplings (Shaft).
Automatic Shaft Coupling Co.
Campbell Mach. Co.
Royersford Foundry & Mach. Co.

Crayons.
American Crayon Co.
Dixon Crucible Co.
Howe Mill Crayon Co.
Lowell Crayon Co.
Walbuck Crayon Co.

Cutting Machines.
Eastman Machine Co.
Firsching, J. A.
Ireland Machine & Foundry Co.
Oswego Machine Works.
Perkins, B. F., & Son, Inc.

Cylinder Oil (Superheated Steam).
Power Specialty Co.

Decating Machinery.
Parks & Woolson Machine Co.
Schwartz, L. H. A., & Co.

Disinfectants.
Barrett Manufacturing Co.
Seydel Mfg. Co., The.

Dobbies.
Crompton & Knowles Loom Wks.
Halton's, Thomas, Sons.
Stafford Co., The.

Drawing Rolls.
Hood, R. H., Company.
Metallic Drawing Roll Co.

Drinking Fountains.
Johns-Manville Co., H. W.
Puro Sanitary Drinking Fountain Co.
Rundle-Spence Mfg. Co.

Drives, Silent Chain.
Morse Chain Co.

Drying Boards.
Pearson, J. T.

Textile World Journal

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CLARENCE HUTTON

For Publishers Announcement See Page 39

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A TENET OF OUR CREED: WE BELIEVE IN THE CONSERVATION OF AND PROTECTION TO DOMESTIC INDUSTRIES.

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ALTHOUGH the volume of war orders received by domestic textile mills was but a small fraction of the business placed during 1915 and now on the books, the effect of the war has been the most important factor responsible for the present activity in nearly every part of the industry. It has raised a protective wall around the industry equal in effect to the highest tariff on record and has effectually checked the flood of imports that was prostrating the industry when the European war broke out. By stimulating trade in other industries it has created an increased domestic demand for textiles and the effect of these combined factors has given to most branches of the industry one of the largest volumes of business on record. Although the scarcity of dyestuffs is seriously affecting the trade it has not materially restricted production or consuming demand. The variety of colors available has been cut down, as has the quantity of color used for fabric ornamentation, but the most serious phase of the dyestuff scarcity is yet to be experienced. Probably more woolens and worsteds, silks and cotton goods are being manufactured in this country to-day than ever before, and the majority of mills are so well sold ahead that it is safe to predict that this condition will last through the next six months. Predictions covering a longer period are unsafe because of the uncertainty regarding the duration of the war and also because of the uncertainty concerning the political situation. Although prices of wool and silk manufactuers have been advanced in a radical manner during the year, this phase of the situation is not causing manufacturers much concern, because it is the very general opinion in the textile industry that nearly all classes of textile raw materials will enjoy a further advance after peace is assured and the textile industries of Europe begin to operate again upon a normal basis. Already there are evidences that European manufacturers are commencing to prepare for a resumption of normal business by accumulating stocks of raw materials in this country. That they will wage the strongest kind of commercial warfare to regain lost advantages in export markets is certain, and unless this country is prepared to meet such an invasion, it must prepare to lose its present industrial prosperity. While there may be a scarcity of skilled male labor in Europe for a long while after the war, there will be no scarcity of women and child labor, which is the principal reliance of Europe's textile industries; therefore textile manufacturers in this country have more to fear from industrial warfare following the war than any other class of domestic manufacturers.

War Helps Domestic Textile Trade by Imposition of Imaginary High Tariff.

WHILE the exact totals of war orders received by domestic manufacturers and distributors will probably never be known, yet it is safe to say that in the aggregate they have formed one of the most potent influences since the outbreak of the war in relation to the operation of domestic textile machinery. These orders came for, the most part, at a time when the industry was in dire need of business, and as a consequence were accepted at figures that did not represent a normal margin of profit. As a matter of fact, many were taken at cost, simply to keep machinery in operation, and with the full knowledge that they meant no gain to those who accepted them, but simply an opportunity to keep operatives employed. Of course, this state of affairs has not continued during recent months, and it is the testimony of those intimately connected with the later orders received that a very substantial profit has been possible in the majority of instances. Exceptions are in the case of those who were unable to make provision for their requirements, and who were not successful in securing prices on finished goods commensurate with the increased quotations on their raw material and supplies. Although certain criticisms were disseminated early in the year regarding methods of American manufacturers in filling orders for foreign armies, it is a satisfaction to be able to state, from positive knowledge, that the overwhelming bulk of orders filled by American manufacturers have been fully up to specifications, and have been accepted as satisfactory in every particular. Where any deviation from Governmental regulations has occurred it has been the result of following specifications supposed to be standard, but which had been lowered in order to secure merchandise at a price on which an abnormal profit might be made by the intermediary. Whether additional war orders are to be received or not, it is difficult to say, much depending not only on the continuance of the war, but also upon the ability of foreign manufacturers to supply the requirements of the warring nations. That America has benefited from the misfortunes of those engaged in the terrific struggle abroad is true in possibly more senses than one. While financially the gainer, it is hoped that the wool manufacturer may witness an improvement in market conditions as an indirect result of the transactions to which many have been parties during the last several months. A new idea of bulk business has been gained by manufacturers and selling agents which may make their attitude toward buyers, who endeavor to secure uncommercial advantages, a more determined one, with a more insistent demand for business-like operations. If this trade shall have been a factor in effecting an improvement in general market conditions, it may be looked back upon as having been much more than a mere assistance to the payment of dividends, or the means of giving increased work to textile operatives.

* * *

War Orders Prime Factor in Improvement of Textile Business.

WOOLEN manufacturers have been confronted throughout the year with greater and more complex problems than at any other period in the history of the industry. Opportunity was hardly afforded to adjust themselves to the conditions imposed by the drastic tariff revision when the raw material market was entirely disrupted by the outbreak of the war, and the consequent interference with shipping facilities. Embargoes on wools from Great Britain and her colonies, which for a time threatened seriously to handicap domestic mills have been so modified that there has been no acute shortage, except on certain types of materials, and for these, manufacturers have been forced to substitute other stocks, even though the cost has been considerably more. The wool situation reduced to a workable basis, the dyestuff problem arises, and this, at the moment is by far the most serious difficulty with which the trade has to deal. Mills in general have been very well employed during the year, thanks to the demand for blankets and military cloths from abroad, and to the very marked falling off in imports, due to the engagement of foreign looms on military cloths. The new year opens with the most unprecedented demand for goods that has ever been witnessed, a situation that normally should bring joy to the heart of the manufacturer, but, as usual, there is a fly in the ointment. The dyestuff situation not only threatens to be, but really is acute, and more than one mill is forced to govern its selling policy by the quantity of coloring matter on hand. Reimposition of wool embargoes, recently announced, is regarded as likely to afford further problems for the near future, dependent upon the scope and continuance of the reported action.

* * *

Unprecedented Conditions Operate in Wool Manufacturing Industry.

ALL previous records for the amount of wool handled in this country were broken in 1915, and, when final statistics become available, it will probably be shown that Boston has superseded London, at least temporarily, as the world's largest single wool market. Imports, based upon quantities, reported "entered for consumption" and "withdrawn from bond," aggregated 340,510,022 pounds; although the final government statistics of imports may modify these figures somewhat, they are a close approximation. Added to the domestic clip for the season they give a grand total of over 630,000,000 pounds. This is far in excess of the quantity of wool handled in this country in any previous years and is rendered more important by the fact that a larger proportion than usual of the imports was so-called clothing and combing wool; imports of carpet wools showing an actual decrease. The figures demonstrating Boston's prime importance as a wool mart are based upon statistics of receipts compiled by the Chamber of Commerce of that city, to which are added the unsold stock on hand, and the stock on hand at the close of 1915 is then deducted; the total remaining is 393,110,394 pounds, and represents Boston's wool sales for the year. London seldom sells over a million bales annually, or not much in excess of 350,000,000 pounds, and the corrected statistics for 1915 will probably disclose a smaller amount. In view of the fact that the worsted division of domestic wool manufactures operated far below maximum production during the greater part of the year, and that wool importing was fraught with almost as great uncertainties as during 1914, the wool business of the country and of Boston is rendered all the more notable. The general tendency of prices throughout the year was almost steadily upward, the few setbacks proving only temporary, and the fears of the trade being each time proved unwarranted. Despite the arbitrary, and frequently embarrassing rulings of the British Board of Trade, trading in foreign wool has expanded materially, and American support of the Australian, New Zealand, and Cape Colony markets has been as important as it was in South America for the season of 1914-15. An important feature of the present season is the scarcity of all good wools, whether crossbred or merino, and the steadily advancing tendency of prices. The latter now average 50 per cent. above the low point of 1914, and fully 25 per cent. above the low level of 1915. It has been a year in which a buyer operating regularly, week by week, could

Record Raw Wool Movement. Boston Now World's Largest Wool Market.

hardly fail to net a good profit, and profits on nearly everything, but some of the highest-priced domestic woods, have been very satisfactory.

* * *

Cotton Manufacturers Do Not Forecast Trend of Raw Cotton.

THE cotton manufacturer's position on raw material is usually the determining factor in any year's success or failure. Opportunity to take advantage of low prices for raw material is sometimes so much in evidence that it becomes the governing influence in a year's business. This, however, has not been the case during the year 1915. The course of raw cotton was such that there was little warrant for manufacturers to anticipate requirements, and yet if they had done so their position would have been immeasurably improved. Cotton never demonstrated the "innate perversity of inanimate objects" in better manner than has been the case during the last twelve months. Every prophecy has gone wrong and the exact opposite to what should have occurred has taken place. Nevertheless, in spite of the inability of the majority to forecast the future, cotton manufacturers have experienced a fairly satisfactory margin of profit on their merchandise, made possible by the upward trend of values during the last half of the year. The liquidation which has taken place in distributors' stocks, as well as with the retailer, has necessitated almost continuous operations, which in the aggregate have amounted to a surprisingly good total. One feature of this demand has been that it has had comparatively small assistance from export markets. To be sure, development has taken place in what were formerly known as subsidiary markets, and expansion here is likely to continue. But the growth of export trade to markets formerly undeveloped by American manufacturers has been offset to a very large extent by the decline in business through the former ordinary channels. Advances in price have not been taken advantage of to their fullest extent, owing in many instances to the inability of the manufacturer to make satisfactory delivery. Of course, the dyestuff problem has been a material factor in this connection, and the acuteness of this situation shows no sign of lessening.

* * *

Knit Goods Experience Extremes of Sentiment in Trade.

THE year just closed has witnessed remarkable progress in the knit goods field, from January with its small restricted trading and depressed prices to December with its generous advance ordering at quotations that permitted a fair margin of profit. So complete a change of spirit during the comparatively short period of twelve months is an unusual spectacle, and the situation at the end of the year was one that few except the most optimistic had dared to foresee. The chief puzzle of the present day in knit goods concerns the dyestuff supply, a fact of particular force in the hosiery industry. The hosiery trade has forced its way through a period marked by a sharp cut price competition only to reach a point where there is still restricted profit because of the high prices paid for dye materials. The underwear industry has not met this obstacle to its progress, and mills are now operating to greater capacity with larger advance orders on their books than for a number of years. Competition by price cutting has not been absent from the underwear trade, and during the spring and early summer it doubtless resulted in setbacks which present profits are just beginning to overbalance. The sweater trade has rarely passed through a poorer period than the first half of 1915, but there has been improvement during the fall, brisk call for nearby delivery goods and now that the new fall season is opened, agents find that buyers are again willing to operate on long future contracts. The increased use of fiber silk has been a striking feature of both the hosiery and the sweater trades. Hosiery of this class has led its field in popularity, and fiber silk sweaters were large sellers during the spring and summer. Both of these trades face a dilemma in the fact that their best business is possible on fiber silk goods, while the fiber silk itself is so scarce and high priced that much of this merchandise can no longer be offered in the popular price ranges. Export demand has provided an unusually large proportion of knit goods business during the year. Army contracts were the feature of the foreign trade last winter, while since then there has been a steady development in the civilian trade both in Europe and South America for American underwear and hosiery, a trade which many believe can be held after the war.

* * *

Future of Export Trade Matter of Considerable Speculation.

THE relation of domestic and export trade may show a decided change if the current improvement in the former division of the textile industry continues in any material form. Sellers have found increased opportunity to do business in foreign countries since the war started, but the permanency of this trade is a question which is by no means settled. Instead of the large flood of orders which was prophesied as the result of war conditions, business received has been largely of an emergency character, which may or may not be of lasting benefit to domestic manufacturers. Much stress was laid upon the opportunities existing in the South American markets for makers and distributors of domestic textiles. It cannot be denied that a larger volume of business has been received from Latin America than would have been possible under normal conditions. This applies to both cotton and wool goods and the total received has kept busy a good many looms which would otherwise have stood idle. It is only natural to ask in connection with these orders whether the future is to witness a continuance of operations which will approximate the comparative rush of the last few months. As a matter of fact it is pointed out elsewhere in this issue that the volume of textile exports has fallen off during the last two or three months as compared with the previous record. The total has not been particularly encouraging to those who looked for large accessions to their business, while the tendency mentioned may mean even less of encouragement for the future. No one can tell what may happen after the war is over. The position of foreign nations in reference to their export trade may be decidedly changed after peace is declared. The necessity of recuperation may be so much in evidence that unusual efforts at competition may be witnessed. England is to-day endeavoring by every means in her power to conserve her export markets, evidently in the hope that she may be in a position to dominate these markets as soon as the conflict ceases. With such possibilities of strife for trade supremacy, the eventual position of the American textile industry with reference to exports is naturally undecided.

* * *

Industrial and Commercial Preparedness Not a Political But a Patriotic Issue.

THERE has never been a time in the history of this country when the sentiment, standing at the head of these editorial columns, was more significant than to-day. National legislation insuring the permanent "conservation of and protection to domestic industries" is needed quite as much as any that may be designed to establish our military and naval preparedness against possible foreign invasion. The specter of military invasion is shadowy and vague as compared with the menacing shape of commercial invasion. The latter is not only certain, but is being openly organized in advance of the close of the war, when Europe's battling millions shall return to peaceful pursuits and engage in strenuous endeavor to recoup their shattered fortunes. The 75-centimeter guns of commerce will be low manufacturing costs, and in their textile industries, owing to the numerous employment of women and children, low labor costs will add materially to the destructive power of their commercial artillery. Preparedness against this invasion may be of two kinds: Reduction of manufacturing costs to the European level, or the erection of protective barriers. The first is incompatible with American ideals and standards of living, and the latter is unfortunately blocked, at least temporarily, by politics. There is nothing spectacular about industrial preparedness; it requires no mighty fleets, no great armies, no emergency taxes to raise hundreds of millions of dollars, no gold lace, epaulettes nor brave flags. It requires nothing but the patriotic elimination of political differences and the re-enactment of an adequately protective tariff. If Congress cannot rise above narrow political prejudices, then the electorate of the country must prove its patriotism and send to Congress those who can be depended upon to conserve and protect their industries.

* * *

Dyestuff Problem and its Close Relation to the Industry.

NECESSITIES of increased dyestuff supplies have caused endless discussion during the year, with the probability that this discussion will be continued until long after peace is declared and more normal conditions are witnessed. The problem of securing dyestuffs from Germany, while by no means unimportant to-day, is probably subordinated in the minds of the majority to the development of a self-contained domestic dyestuff industry. As to what may be expected in the way of legislation to protect and encourage the growth of this domestic production, it is too early to prophesy, although active effort to determine on some plan of action is being made at the present time. Much credit must be given to those pioneers who have endeavored to meet the crisis in this country by an increased product on a wider range of materials than before, with the result that in certain lines the shortage has been partially relieved. That demand for increased duties will be agreed to by consuming interests is undoubtedly true, although it is a question whether the textile industry will agree to a duty on those things which are not being made or are not likely to be made in this country. Just where the line of demarkation is to be drawn, and how, remains to be determined, but there are those to-day who question the advisability of advocating legislation of an omnibus character, which may eventually have to be altered.

* * *

Little New Construction Until Lately Despite Early Low Costs.

IF low prices for building material and equipment had been a sufficient incentive, 1915 would have been a banner year for new textile mill construction. But during the first half of the year the business clouds hung very low and thick and few manufacturers were able to foresee the marked expansion of textile trade as well as of nearly all other domestic business. There have been recent periods when building materials have been lower than they were during the first half of the year, but never has there been a time when labor was more plentiful, contractors more eager for business or textile machinery cheaper. It seems almost incomprehensible that such a marvelous change in conditions could be wrought within six or eight months. War has produced no more startling changes in European landscape than it has effected indirectly in the business status of this country. Even in textiles, although less directly benefited by the war than most other industries, more mill construction and re-equipment work has been projected within the last three months than during the preceding months of 1915. TEXTILE WORLD JOURNAL'S annual review of new mill construction, including new mills and enlargements, covers little of the construction that has been projected during the last two or three months and which totals a larger capitalization and equipment than was involved in earlier work, particularly in the cotton branch of the industry. It is notable that the total of new spindles recorded in our tabulation is only 351,272, or but little more than one per cent. of the previously existing total. However, it is about 106,000 spindles in excess of the 1914 total and is also slightly larger than for 1911 and 1913, but is 182,000 less than for 1912 and far below the record total of 1,206,496 spindles in 1909. The building and equipment record of other branches of the textile industry is almost identical with that of the cotton branch and faithfully reflects the culmination of three most unsatisfactory years.

Our China Trade—Have We Lost It?

By Howard Ayres, New York

THE statement has recently been made that seventy-five per cent of the cotton goods commission houses of New York believe that the trade with China in cotton cloth made in the United States is irretrievably lost. It may be interesting to consider briefly the situation that has inspired that belief, and how far the feeling of hopelessness is justified. To do so it will be necessary to review the period during which the China business grew into importance and declined, and to weigh the causes and effects.

There is an interesting statistical history of the China trade in our cotton cloth, which may be presented without formidable array of figures, and interpreted in the light of political and economic events in that market of fascinating enigmas.

Beginning many years ago with occasional shipments by sailing vessel, in the days when the romance of far eastern trading hung over all transactions, when the voyage was one of mystery and daring, and the fortunate arrival of a cargo to a market bare of stocks made profits that would be considered fabulous today, shipments of cloth under brands still popular when any demand exists, it was not until about 1870 that it attracted attention by growth in volume and steadiness. What it has been is well shown by the record in periods of five years, as follows:

	Total Packages.	Average per Year.
1875-1879.....	209,680	41,936
1880-1884.....	289,775	57,955
1885-1889.....	493,176	98,635
1890-1894.....	529,507	105,901
1895-1899.....	1,078,146	215,629
1900-1904.....	1,188,626	237,725
1905-1909.....	1,357,070	271,414
1910-1914.....	644,312	108,862

These figures are expressed in packages because there is no certain way of tracing from shipments the relative quantites of sheetings, drills, jeans and flannels, and because values have been fluctuating too widely during this period to make a safe basis of comparison, and the trade records are used for this purpose in preference to the government reports of clearance.

INTERRUPTED WAR GROWTH

Like all averages, the figures given above are misleading in showing a steady and uninterrupted growth until 1910. The China trade has not been so happy. It has passed through convulsions unparalleled elsewhere. A fairer statement for the years most significant is this:

	Total Packages.	Average per Year.
1893-1895.....	250,007	83,335
1896-1899.....	995,423	248,856
1900.....		143,770
1901-1904.....	1,244,856	311,214
1905.....		692,868
1907-1908.....	147,579	73,789
1909.....		204,458

setting forth the vicissitudes of the trade, and affording a basis for explanation of causes.

DECLINE DURING BOXER TROUBLES

The influence of the war between China and Japan, 1904-1905, and the disturbances coincident, is shown in the decline in shipments 1893-1895. In the years 1896-1899 began to be felt the impulse of a larger trade, only to be overwhelmed by the Boxer outbreak of 1900. Like many of the cataclysms of the China trade, that violent disturbance came without effective warning, the premonitory symptoms being of an unbelievable sort. The shipments of 143,770 packages during 1900 were made during the first six months, as those of 1901 were after that year was well along and a resumption of commercial operations was possible. It must be remembered that for a market so distant as that of China, and particularly for one willing to take cloth under certain proprietary brands only, purchase must generally be made long in advance of time of shipment, and without knowledge of what may happen before the goods are delivered at destination, and shipments may continue after an event that for a nearer and more flexible market would prevent all movement of goods. So also shipments reappear slowly after the incentive to renewed trading is felt. But there must be some period set for the record.

MOST FAVORABLE PERIOD

The years 1901-1904 mark the time when the China market for American cotton cloth was at its best, when shipments and consumption were in volume that has come to be considered normal, when the average was fairly steady at 300,000 packages per annum, and measured the capacity of the trade until new and better conditions should prevail. Unfortunately subsequent conditions have not been better, and that period is still the golden age. There had been a quick recovery from the depression of the Boxer outbreak, the lessons of that anti-foreign frenzy and its penalties were salutary, the country was prosperous, the native credit banks were courageous, the dealers in ample resources, and the ultimate consumer with his purchasing power still unimpaired. So well fortified was the market and substantial the well being of the country that a decline in silver bullion in 1901-1902 to the lowest value ever touched, 21 11/16 pence sterling per ounce, was absorbed without more than temporary hesitation.

The year 1905 was highly abnormal in showing the largest purchases and shipments ever made for the China market. During previous years the native merchants had made large profits, the course of the war in progress between Russia and Japan had encouraged them to expect the recovery and expansion of trade with disputed territory, and the war demand for some of their stocks at outports led them into a very debauch of buying. So large were their operations that it took all of 1906, although very early in that year the reaction had come, to complete shipment. One unfortunate feature of that movement is that the China trade has always been measured by what was then bought, and anything less than that huge volume is considered disappointing.

(*Continued on page 83*)

Red Sea Trade and Its Advantages

Frank Kidde of the Livierato-Kidde Company, New York

BUSINESS in cotton goods to Aden during 1915 has been excellent. Upward of 70,000 bales were probably received there from New York during the year, and while distribution in the Arabian interior was difficult, Abyssinia and new markets on the African coast were good buyers. Prices in New York are now over a cent a yard higher than the average prices of the year. More important still from the standpoint of the Aden buyer is the advance in freight and insurance, which has risen from about a half-cent a yard to almost three times this; in other words a 350 coarse count sheeting costs to-day in Aden 7c instead of 4¾c. New business is naturally slow in developing.

It seems possible to do a little moralizing as to the business done with Aden this year. It is an important outlet for American cotton goods. For years exports thence held second place only to the Chinese exports, and in this last year the volume of business shows Aden as the largest single market for American cotton goods. It is the trading center of a vast area with great possibilities; also, in normal times, with great competition from other cotton manufacturing countries. Our goods from Aden are shipped not only into Arabia, but also to trading ports in Persia on the Gulf, to Abyssinia and the vast adjoining African territories. Aden, or as it is better known, the Red Sea trade, is an important outlet for American cotton manufacturers. The moral that can be derived from the year's successful business to this area can possibly therefore be one of wider application to our export trade in cottons in general.

WISE BUSINESS CONSERVATION

We believe this moral to be the fact that this large volume of business was handled along conservative credit lines by the mills. A great deal is written nowadays in the way of preachment to those hardened old sinners, the American manufacturers. According to the Consuls and some of our daily editorial writers, these individuals sleep too much during office hours and are daily neglecting immense and glittering opportunities in the foreign trade. Particularly they are supposed to be too shy about lending out their money to their foreign customers, which is the blunt way of expressing more complicated terms such as allowing ninety-day drafts, acceptances, or credit accomodations, which things are always given away free by our efficient friends, the Germans, or by Manchester. Yet when we look at the splendid progress of many groups of our American mills during the last decade or two, say, for instance, the Dwight or the Massachusetts, and contemplate the brains and energy of their merely American managers, we for our part feel that perhaps they can't be so wrong after all. While they may be provincial as their critics claim, on the other hand their critics may be simply ignorant and the criticism, as often, cheap and easy.

GRANTING LONG CREDITS

At any rate the Aden business was done this year as it has been done for many years in the past without putting the entire burden on the manufacturing party to the transaction. Great pressure was brought to bear by new factors attracted to the trade and by others to induce the mill people to carry the bag on this business by extending sixty to ninety days' time. We believe mill managers acted wisely in insisting that this was not their function in the marketing of these shipments to Aden. We believe it to be worth while to commend the stand which was taken by the best leaders in the Worth Street trade on this subject and think it will contribute to clearer thinking in connection with the business by stating in a public way the fact that the trade thrived without the granting of long terms, even though, paradoxical as it may seem, long terms were actually granted to at least a large part of the trade in Aden.

The paradox is, of course, no riddle to those conversant with the trade. However, there is so much loose and thoughtless criticism of the American manufacturing export policy that it is worth while to repeat that the credit or time on this business was extended to the Aden buyers by those best equipped to do it, to wit: the merchants and the foreign banks who are in this business. These are the factors, who by experience and acquaintance with the field of operations, should be expected to loan money pending arrival and liquidation of shipments. It is to be hoped, of course, that there will be an extension of American banking interest and that more American banking funds will find employment in foreign trade, but this condition is certainly on the mend and in the meantime excellent banking facilities exist for merchants in good standing. In this connection these banks are in a better position to know the traders at each end (in this case in New York as well as in Aden) than the mill people could possibly be, and in this way it is quite possible that a deal of mushroom business has been avoided—business that would not benefit permanently the American interests abroad. The best the mills can do in their foreign trade is to find solid, responsible merchants to handle their goods abroad and the foreign banks are a positive help to this end.

Nor should the manufacturer be criticized as failing to do what his English or German manufacturing rivals do, or better, what they are supposed to do. It is quite true that traders in Aden receive long payment terms from Austrian, Italian and English sources, but what interests us in this discussion is just who in these competing countries gave the credit. To our positive knowledge in Austria and Italy these terms are granted not by the so ignorantly lauded Austrian and Italian manufacturers, but by their allies, the merchants and bankers there.

COMPARISON WITH MANCHESTER

It would not be wise to make such a sweeping generalization regarding German or English manufacturers. The trading organization in Manchester, according to the writer's own observation on the ground, although very complicated and hard to translate into terms or names understood by us here, is, however, similar in this respect—that essentially speaking, the actual manufacturers do not deal directly abroad. Credit accomodations are therefore very largely carried by the so-called shippers or merchants, who in turn go to the banks in order to grant their foreign friends the long terms we hear so much about.

The foreign cotton business in Manchester is, however, very large, and there are many systems of business going on alongside each other, controlled by special considerations applicable to the special markets or character of the trade. Generalities are dangerous, but with some exceptions it will be found that in Manchester, as in Hamburg, the manufacturer sticks pretty much to his line, and leaves the actual shipping and billing to his allies, actively and entirely engaged in the foreign end—call them brokers, or merchants, or commissionaires, or shipppers, or resident agents, or jobbers, or whatever other trade names the long experience and volume of export trade in these markets has evolved.

Let us not theorize too extensively about our own successful trade in cottons but allow ourselves a little self praise, to this extent, that right here in New York as well, the experience of years has evolved a fairly good method of foreign trade development. Manufacturer, merchant and banker are all equally necessary to the sound and healthy growth of our export trade.

Cotton Goods Export Trade Outlook

By R. K. MacLea, New York

OUR total exports of all manufactures of cotton are now close to 11 per cent. of our production. The exporting of cotton cloth, which is the principal item of manufacture in the cotton goods industry in this country, is, however, but 5.4 per cent. of our total production. Most remarkable conditions exist. With mills consuming cotton at a record pace, we have failed to increase our general exports as expected.

The fiscal year of 1915-1916 probably records the apex of cotton goods exports from the United States. Startling as this may sound, to those in the cotton goods business it spells "Stop! Look! Listen!" for it is apparent that upon analysis of the various conditions existing at present buying caution will shortly prevail.

When we deduct what has gone out for the use of soldiers in the European war, our exports are insignificant, except as is well known, in underwear and hosiery. The popular belief that we are exporting enormous quantities of cotton goods is a pardonable error, for talk has magnified the real situation. We are practically doing little more than normal on the bulk of our productions in the cotton industry.

There are special branches of our export business that shine as a star on a clear summer's night. The knit goods end has been called upon heavily to supply urgent present foreign demands. It is largely because of this feature that our total exports for the last year, based upon nine months' government returns, show an increase over the preceding years.

COMPARISON OF STATISTICS

For the ten months ending October 31, 1915, we exported a total of $30,169,292 worth of knit goods and other wearing apparel, against $9,712,622 in 1914 and $9,410,778 in 1913, the export of cotton knit goods alone approximating six times the normal exports, as shown in the year 1913.

Formerly Germany supplied much of the foreign field that was suddenly compelled to come to us for these special lines. We will hold much of this trade, and more than likely become well established in it, not only in the various countries near by, but in England and her colonies, and probably Russia after the war. England is finding our knit goods and hosiery to her particular liking, and no doubt will be glad to continue their use after the war on the present scale noted. The English people are learning to like these products better than those they formerly obtained in Germany. "Made in America" brands in best grades will find increased use there.

During past years—that is, before the European war—our normal exports of cotton cloth, which is our principal production, amounted to not over 5 per cent. of our output. At present, taking a basis of ten months to November 1, 1915 (according to last government returns), our total cloth exports have increased only 37,705,113 yards; that is to say, from 393,649,754 yards in 1913, which is the last normal year for comparison, to 431,355,267 yards this year. This shows less than 11 per cent. increase on normal "exports of 1913." Thus the gauge of comparison shows really no increase of exports worthy of mention on this most important item of production. We have just shipped out of the country not quite 4½ millions of dollars more of all kinds of cotton cloth than in the same ten months of comparison in 1913! Apply this to our total output, and the fact stands out that the apex of our export expansion is but 5.4 per cent. of our production compared with normally—from 3 to 5 per cent., as exported in recent years.

Upon further analysis a comparison of the total gray goods, duck, etc., exported shows the very surprising fact that on recent ten months' government returns an actual falling off in exports has occurred when compared with 1913. It is misleading to use the comparison of exports this year with those of last year. It is true our exports of duck and sheetings are greater than last year, but we are really shipping far less than in 1913; in fact, actually 31,155,112 yards less. Furthermore, we are away behind our exports of 1912, when a total of 247,131,711 yards were exported. A small comparison as reported by the government is as follows:

Oct. 31 (10 mos.)	1913. Yards.	1914. Yards.	1915. Yards.
Gray goods	211,577,557	108,856,507	180,422,445
Duck, etc.	$14,604,447	$7,881,317	$14,738,258

Exports total gray goods in—

1915.....Ten mos. as above.
1914.....199,886,679 yards
1913.....213,189,754 yards
1912.....247,131,711 yards

It is therefore noted that the small increase in cloth exports that has taken place has necessarily been in bleached, colored, dyed or printed goods. For ten months of this year, as against same ten months of 1913, less than $4,500,000 increase has taken place. This increase has been shipped principally, however, to nearby places favored by freight conditions, such as Cuba, the West Indies, British East Indies, the Philippine Islands, etc. The slight increase to Great Britain and Canada is solely for war purposes, as indicated by the values. The following table of comparison for ten months ending October 31 confirms this statement:

Exports for 10 mos. ending Oct. 31.	1913. Yards.	1914. Yards.	1915. Yards.
Bleached cloth goods	33,398,602	33,949,362	58,724,974
	$2,639,144	$2,824,682	$3,940,313
Colored cloths	148,673,595	134,457,770	198,207,848
	$9,857,666	$9,978,145	$12,917,959

This showing is very disappointing. It strongly suggests that something must be very much amiss. Before discussing this point, however, it should not be overlooked that Great Britain is very rapidly resuming normal export conditions in the cotton industry. The British Board of Trade returns at the end of the year covering the recent quarter show that Great Britain has increased her exports of cotton goods for "August to November," 1915, by 58,441,000 pounds. This is an increase of nearly 16 per cent. on a quarterly export of about 300,000,000 pounds of cloth, yarn, etc. In examining this increase, however, it is noted to be particularly heavy in the latter part of the period, which is significant.

OUTLOOK ON DOMESTIC BUSINESS

Thus we can realize our export conditions at a time when the home market is having a most healthy state of business expansion in all branches of the cotton goods industry. It is observed that inflation of finished goods prices at the retail and jobbing end is automatically shutting the gates of continued expansion. Caution must be the watchword on finished purchases from now on in this country, if the wholesaler is wise. We will more than likely not be able to hold our apparent expansion, even though it is below acceptance. Conditions are against it. The interesting question now develops as to the reason of our inability to export more from our production of cotton goods, for we certainly have come to a period where much more serious consideration of the difficulties we are facing had better be given. We must not blindly pull ourselves up by the bootstraps, inflate our chests and proclaim that we are going to get the world's trade in cotton goods because of our supposed great opportunities. Sad disappointment awaits us if we do. They do not exist. We can no more capture the world's markets in cotton goods than can Henry Ford dictate the terms of peace in Europe. Radical remedies and changes in the selling methods are necessary. Will such requirements meet favor? The answer seems "No." At least not until our mills are so independent that they can use the English and European methods of buying raw materials and distributing finished products. In addition, the many other difficulties with which we have to contend must be overcome. We have been handicapped by the foreign exchange situation. The premium on a dollar has assisted in acting against us in the Far Eastern markets.

Business with the Far East has

(*Continued on page 234*)

Future of America's Export Trade

By B. F. Larrabee, New York

WHEN the European war broke out in August, 1914, the export trade of the United States was moving quietly along, each year gaining in volume. During the several months immediately following, or generally speaking, until January, 1915, intense depression prevailed and foreign as well as our domestic trade suffered in common.

American exports are made up very largely from a certain group of raw materials and grains. Of the former cotton is by far the most important. It is but natural that a serious decline in the price of this commodity should immediately follow such a sudden and unexpected interruption as the war brought about in its shipment abroad. As a result prices of manufactured goods underwent a corresponding reduction, and producers found themselves in the midst of one of the lowest markets ever experienced.

APPEARANCE OF WAR ORDERS

Late in December, 1914, and during January, 1915, foreign governments began to make their demands upon us to furnish hitherto unheard-of quantities of hosiery, underwear and other articles too numerous to mention. This demand, coming as it did at a critical time, was very welcome. Immediately following this came the inquiries from the civilian trade from almost the entire world. And over night, as it were, this country was in the midst of a business of the conduct of which most manufacturers were ignorant.

EXPORT USAGES UNKNOWN

Shipping goods from Philadelphia to Chicago is quite a different matter from shipping them from Philadelphia to Buenos Aires or London. It has taken Germany and England many years to develop the system of their foreign trade. We had to try to learn it in as many weeks, and any quick evolution of business is almost sure to develop weakness.

The tariff laws of each country vary and if the shipper fails to adhere absolutely to the requirements of the several countries to which he is shipping, serious friction is sure to occur. The remark is frequently heard that this or that demand will not continue after the war and this is sure to follow careless attention to details. But a considerable percentage of the business gained at this time will surely continue if the situation is only realized and the opportunity grasped. National pride and patriotism should prevent the dumping of poor, unsalable merchandise on the foreign trade because one such transaction affects the rest of those trying to do their share in building up this valuable business.

The hosiery industry was beginning to expand long before the war came upon us, which should be sufficient proof that it has come to stay. But the way to perpetuate this is to unite in trying to make customers want to buy from us rather than because they have to do so.

QUESTION OF CREDITS

Germany and England extend to foreign customers of sound financial responsibility just as many credit facilities as they do trade at home, and this should be so. It is unreasonable to assume that we are building a permanent foundation for our foreign trade by demanding payment before shipment when making such shipment to houses of unquestioned integrity. A year ago payment in advance was an almost indispensable condition of sale, because no one could not tell who would fail next. This was especially true in the Argentine where keen competition had forced the granting of long credits and many of the business houses there were speculating in land and other ventures to a dangerous extent. The avalanche of failures in a single year (1914) reached the stupendous total of nearly two hundred millions of dollars. But the lesson has been learned and those houses which weathered the storm are in a strong position. Credit information regarding firms in most countries is now available.

ORGANIZE FOR EXPORT TRADE

Manufacturers soliciting export business should organize to handle it or refuse it.

Instructions to salesmen visiting foreign countries should be complete and explicit and the acceptance of orders which obviously cannot be shipped for any one of several reasons should be guarded against. But when orders are once booked painstaking care should be given the goods and packing. Poor or imperfect goods upon which a considerable duty may have been paid become a much more serious matter than if the same goods had been shipped merely to Omaha or St. Paul. In the latter case the manufacturer may order them back and the only actual expense involved is the inland freight. But ship the same goods to Australia and the complications are tenfold.

Ocean freight is soaring and now stands at a figure never thought possible. This freight is figured on cubic measurement and shipping cases stuffed with paper or partitioned is a practice not possible to detect from without and if indulged in will in itself add a heavy burden to the ultimate price of the delivered merchandise.

Hosiery, underwear and knit goods are usually ordered in wooden cases

(sometimes in bales). These should be built of very strong, well-seasoned lumber, amply heavy to "carry" but never unnecessarily heavy or bulky, and securely strapped to prevent pilfering en route. Insurance is a considerable item of expense in the ultimate cost of goods but frequent cases have arisen where insurance has been refused by the issuing companies (and reasonably so) because cases have been reported as "unseaworthy."

If the goods are going to be transported largely by water and the customer has failed to specify that the contents are to be protected against moisture such failure should not be an excuse for not taking ordinary precautions. Waterproof paper is comparatively cheap and should be used as a lining in the cases, thus assuring a perfect delivery.

Invoicing is a delicate and highly important part of every transaction and carelessness in stating weights, measurements and the percentage of each of the various materials used in manufacturing the goods (when required) should be noted, not nearly as they are, but exactly, because errors in this respect may appear to searching government officials as an attempt on the part of the importer to avoid some customs payment and the result is a heavy fine and a future very discriminating scrutiny of that concern's shipments.

Requests often appear to the manufacturer as absurd and unnecessary but such is not the case. In every instance a good reason exists for requiring the data asked for and it must be given accurately.

A customer actually reported to the writer recently that he purchased a considerable quantity of men's half hose of a special shade, sample of which he enclosed in submitting his order. The shade very probably was difficult or impossible to furnish. But the manufacturer instead of so stating delivered an entirely different color and practically worthless in his market. When approached on the subject some months later, the buyer was told that the special shade could not be had and the substitute was sent as a favor in order that he might have something to sell. Such methods are inexcusible and amount to the same thing as taking money under false pretenses, because this particular shipment was made against a confirmed commercial credit.

If every American shipper will picture in his mind that every customer to whom he is about to make a shipment is a branch of his own factory in charge of an officer or a member of his concern and will take the same precautions he would take under such conditions and assume, and stand ready to assume, all responsibility for errors or carelessness our foreign trade will grow and become permanent. But otherwise it will last only so long as Europe is restrained from her usual activity in these fields.

MUTUAL SATISFACTION NECESSARY

It is an old saying that business not mutually satisfactory cannot last and with South America, Europe, Africa, India and Australia calling upon us for hosiery, etc., our opportunity is at hand. So let it be mutual, don't take advantage of an unparalleled situation and in the end an all-the-year demand will develop for our goods that in normal times will prove very beneficial.

Foreign trade now realize that prices are subject to overnight advances and if they can only be shown that immediate deliveries of good, new, up-to-date merchandise is impossible they will be content to place orders in advance, as the American jobber does and as they have always done in buying in the former markets. Explain to them that our mistakes are through lack of experience rather than the result of not caring and show a willingness to adjust differences in a clean, straight-forward, business-like manner and a confidence will spring up, without which no foundation can ever be secure. Practically all business is done to-day on some form of credit and that is nothing more nor less than an expression of confidence.

What Can A Tariff Commission Do?

By Winthrop L. Marvin, Sec. Nat'l Assn. of Wool Manufacturers

THIS new year 1916 is manifestly to be signalized by a revival of the agitation for a tariff commission to aid in the shaping of the fiscal legislation of the United States. It is no fresh and unfamiliar subject in America. So far back as 1866, just half a century ago, a Revenue Commission was established by Congress and its inquiries influenced the tariff legislation of the subsequent year. Again in 1882 a Tariff Commission was created for temporary service. The President of this Commission was Dr. John L. Hayes, the first Secretary of the National Association of Wool Manufacturers. A bill to create a customs commission in the Treasury Department was passed by the Senate in 1889, but failed in the House of Representatives. In 1911 a tariff commission bill, the result of an active, widespread propaganda, was passed by the House and then approved in a modified form by the Senate, which sent it back to the House too late in the session for concurrence and enactment. The Tariff Board of 1909-1912 was virtually a creation of President Taft and was not continued by the succeeding Administration.

WHAT GERMANY'S EXAMPLE IS.

A permanent tariff commission such as is now advocated is an institution wholly new to the governmental policy of the United States. Originally the hope was strong that a permanent commission could work the miracle of taking the tariff out of politics. There are those who still cling to this delusion, but they are significantly fewer in numbers every year. Germany a few years ago was proudly pointed to by champions of the commission idea in the United States as an example of a nation where a permanent tariff commission had removed the tariff from party politics.

But the German commission is not and never has been permanent. It is organized when needed for a specific purpose and when its work is done it automatically disappears. It has been composed in part of government officials and in part of representative manufacturers and merchants, and it has not taken the tariff out of politics, as Mr. Julius Forstmann, a former member of the German Commission and now an American wool manufacturer, has very clearly pointed out, because in Germany the tariff is not and has not been in politics in the American sense.

The tariff in Germany is not an issue upon which political parties divide. There are protectionists in all German parties, and the protective idea is so absolutely dominant that the one animating motive of a new German tariff law is always to make German industries as prosperous and German employment as constant and complete as possible. The economic preparedness of the German Empire, as the whole world now knows, has been quite as scientific and as thoroughgoing as its military preparedness.

CANNOT BE NON-PARTISAN.

A permanent tariff commission is an institution for which there is no precedent among the nations at the present time. And it is equally true that there is no precedent abroad for a non-partisan tariff commission if by this is meant a board upon which free traders or tariff-for-revenue-only men are evenly balanced against protectionists. It should be realized that protectionism is now the fixed and accepted economic policy of the entire civilized world outside of the United States of America, for the European war has brought about the downfall of the *laissez faire* policy in the United Kingdom and a return to frank protectionist duties particularly against certain large imports of American production. It is thoroughly well understood that after the present war has ended the fiscal system of Great Britain will be identical with that of Germany and France. Well-informed advocates of a tariff commission in this country are now gradually abandoning the notion that a tariff commission here should be non-partisan and are urging only that it should be competent and permanent.

This is unmistakably a change in the right direction so far as the dropping of a character of non-partisanship is concerned. In America the tariff traditionally has been, and undeniably will for some time longer continue to be, the most acute and irreconcilable of party questions. In practice, it is almost as impossible for thoroughgoing free traders and protectionists to reach an agreement on facts as it would on principles. Indeed, it has usually been on facts, or what were alleged to be facts, rather than on principles that the sharpest divisions have occurred in the Congressional Ways and Means Committee or the Committee on Finance.

A CASE IN POINT

A very recent and pertinent case in point is afforded in the lately published work of Professor F. W. Taussig of Harvard University, "Some Aspects of the Tariff Question." Professor Taussig is an eminent representative of the academic free trade school of thought in the United States, and if there were a "non-partisan" tariff commission he might count with confidence on being a member of it. But Dr. Taussig in his volume above mentioned presents not as a theory or belief of his own but as a fact the proposition that the wool manufacture in this country has failed to justify itself by the manner of its development, particularly because it is steadily utilizing less and less new wool and proportionately more and more cheap or unsatisfactory substitutes for wool—though not only the experience and knowledge of practical manufacturers but the specific Census records of the United States all go to confirm an exactly opposite conclusion. Of course, the great wool manufacturing industry and protectionists in general would no more accept Professor Taussig's facts in such a case as this than they would accept his familiar and characteristic arguments. The only recourse would be for Dr. Taussig to state his views in his own separate or minority report exactly as if he were a Democratic member of the Committee on Ways and Means and at complete loggerheads with his Republican colleagues.

THE TAFT TARIFF BOARD

Even when there is no such hopeless clashing as to what the facts really are, it must be acknowledged that such experience of tariff commission work as we have had in the United States is not entirely encouraging. President Taft's Tariff Board of 1909-1912 contained two excellent minority members, one a professor in a Southern university, the other a former Southern member of Congress. They were modern, open-minded men, and as such able to agree with ther Republican colleagues in reports on matters of fact—wherefore the Democrats in Congress rejected them as protectionists in disguise and by the simple expedient of denying appropriations put an end to the Board's activities. On the other hand, Senator La Follette of Wisconsin, who bore no love for the industrial East and apparently in his own Schedule K would have liked to place 100 per cent. duty on raw wool and 10 per cent. on manufactures, actually professed to find in the Tariff Board report full justification for lower rates on woolen goods than the Democratic Congress finally enacted!

Even so good and conscientious a tariff commission as that of 1909-1912 failed to win any appreciable success toward taking the tariff out of politics, or securing agreement in Congress on certain fundamental tariff facts. When an effort was made in 1913 to convince Chairman Underwood that the differences in the cost of production as disclosed in the Tariff Board investigations proved the peril and unfairness of certain proposed rates of duty, the habitual answer was that Democratic tariff makers could have no possible concern with differences in cost of production anyway—that it was the Democratic business to fix rates that would produce the utmost revenue and that no thought of protecting domestic industry could be considered for a moment. Of what possible use can a tariff commission be to a political party whose dominant Southern leaders in their formal platforms stigmatize all protection as "iniquitous" and "unconstitutional"?

THE REAL MENACE TO BUSINESS

The tariff commission idea would never have persisted as it has in American political discussion but for the perfectly natural and human desire of business men of all parties and sections to take the tariff out of politics and remove a flagrant cause of industrial nervousness. This is a motive deserving of all possible praise. Yet, is there not much reason to believe that business men have failed to diagnose the real source of their trouble? There was no perceptible hesitation, no depression in business, when a protectionist Congress prepared in 1908 to make a protectionist revision of the Dingley tariff that had stood since 1897. Indeed, business improved markedly from the financial panic of 1907 to and through the year 1909, which was one of the most prosperous in our history. It is true, of course, and undeniable that business began to falter in 1913, when the protective tariff of 1909 was in

(*Continued on page* 149)

Cotton Trade and the Lever Bill

By Thomas Sinclair, New York

THE best interests of the American cotton trade have received a severe blow by the operation of the Lever Bill. The practical control of the world's market for American cotton has passed from the United States, where it should belong, to foreign interests. In order to understand the situation clearly a review of the past year is necessary. The subjoined table illustrates the course of the various markets, and demonstrates conclusively that the handicap under which the American markets suffer can be laid solely to section 11 of the Lever Bill.

The "United States Cotton Futures Act" (commonly known as the Lever Bill) was passed by Congress on August 18, 1914, and became effective six months later, on February 18, 1915. Its preamble sets forth that it is "An Act to tax the privilege of dealing on exchanges, boards of trade, and similar places in contracts of sale of cotton for future delivery, and for other purposes."

The Office of Markets and Rural Organization, which administers the Act for the Department of Agriculture, said in a statement recently issued:

"This Act seeks to regulate trading in contracts on exchanges for future delivery of cotton by levying a prohibitive tax on all such trading, except as it complies with certain specified conditions. These conditions were determined with a view to correcting abuses heretofore existing and are imposed on parties to future contracts in order to equalize their privileges and protect the rights of all cotton owners, as future contracts made through the cotton exchanges practically control the price of the entire cotton crop of the South."

The framers of the Bill, however, openly stated that the effect desired was "permanently to lift cotton prices." Some of the resultant effects can be determined from an examination of the subjoined table.

The main portion of the Act deals with the establishment of new official cotton standards of the United States, and the use of commercial differences on the several exchanges.

The standards for nine grades of cotton, in substantial conformity with the international or Liverpool standard, were established on December 15, 1914, and these have been adopted by all the leading exchanges throughout the country. In fact, their adoption was compulsory. The tax made it so. In order to obtain an interpretation of the law on certain workings of the act on the futures market a test case was submitted to the New York Federal Courts, which pronounced the Act unconstitutional. An appeal has been taken on the points at issue which will come up for decision at an early date.

PROVISIONS OF SECTION 11

The part of the Act which has had most influence on the cotton market and produced the most criticism is contained in Section 11, reading as follows:

"That upon each order transmitted, or directed or authorized to be transmitted by any person within the United States for the making of any contract of sale of cotton grown in the United States for future delivery in cases in which the contract of sale is or is to be made at, on, or in any exchange, board of trade or similar institution or place of business in any foreign country, there is hereby levied an excise tax at the rate of two (2) cents for each pound of the cotton ordered to be bought or sold under such contract."

By this Section 11 of the Lever Bill any American merchant, exporter, broker, planter or spinner is prohibited by law from dealing in cotton futures on the Liverpool or any other foreign exchange.

IMPORTANCE OF ARBITRAGE SITUATION

It is impossible for any business man to grasp or understand the point of view which prompted the insertion of this clause. It could not have been done for revenue purposes, because the very amount of the tax ($10.00 per bale) makes the Bill inoperative as a revenue producer, nor could it have been introduced to "equalize the privileges and protect the rights of all cotton owners" as is so naively stated by the Office of Markets and Rural Organization. Indeed, the main fundamental facts underlying the marketing of the cotton crop appear to have been overlooked. Cotton is a world-wide commodity. It is grown in the semi-tropical zone and largely manufactured in the temperate zone. A period of several months elapses from the time the crop is gathered until it reaches the manufacturer. Hence the absolute need of the futures markets to carry the risk involved during this period of the marketing of the crop. Although the United States produces about 62 per cent. of the entire production of the world, it consumes only about 38 per cent. of its own production, leaving the greater proportion (62 per cent.) for consumption abroad, thus constituting cotton as the most important export of the United States. Liverpool is the largest spot market. In addition to its own business, it finances and sells cotton to all parts of the world. And yet Americans are debarred by their own legislature from dealing in its futures. The freedom to do business the world over should be as inherent a right of our citizens as the "pursuit of happiness." How can American cotton people gauge the course of prices in the different markets if they cannot trade in the principal consuming market? How can they compete with foreigners in the export business if they are so handicapped? Any matter affecting one section of the cotton industry reflects directly or indirectly on all other sections. The exporter or merchant by his ability to select cotton from over the entire belt can guarantee the delivery of required grades to the spinner, not only for immediate, but for near and distant delivery. His business is to buy in the cheapest and sell in the dearest markets. If he buys actual cotton in the South he should be able to "hedge" his contract by selling in whatever futures market he considers relatively the dearest or prospectively the dearest. If he contracts with a spinner to furnish him cotton for delivery several months away he should be able to buy futures in New York or New Orleans or Liverpool, whichever he considers relatively the cheapest. When he makes actual delivery to the spinner he may then be "short" in New York and "long" in Liverpool, or vice versa, and only close these contracts as and when it suits him best. The arbitrage situation therefore plays an important part in the marketing of the crop, and Americans should be allowed to operate as freely as foreigners in the conduct of their business.

A careful perusal of the appended table is very enlightening on this subject. Three important deliveries in New York are enumerated with their comparative deliveries in Liverpool. The dates are taken indiscriminately to show the trend of the arbitrage. In each instance the differences widened as time progressed, the January and January-February arbitrage showing a difference of 325 points at the year's close. At this writing this difference has increased to 386 points with every prospect of a higher figure being reached. Augusta, Ga., has been selected because it is the largest inland competitive market, that is to say, there is large local mill buying in Augusta competing with an export demand. Sterling exchange, bar silver prices, and freight rates are added for comparison purposes. The table conclusively shows that New York nas carried the burden of the selling of "hedge" contracts. It has been considered all through the year as the relatively dearest market, and immense profits have accrued to foreigners who have sold New York futures and bought Liverpool future against same.

There has been considerable agitation for some time past over the export situation. The leaders of the movement have been shouting platitudes in the customary hyperbolical language. They assert that Norway wants cotton, Sweden wants cotton, Denmark wants cotton, Holland wants cotton. The average consumption of these four countries per annum amounts to about 250,000 bales. The exports to the entire European continent (omitting France) from August 1 to December 31, 1915, were about 100,000 bales less than in the same period of 1914. So that there can be no absolute need of cotton in Scandinavian countries. They may want cotton, but not for their own consumption. And in any case who in America is going to supply them? What chance has the American merchant or exporter of competing with the foreigner when he cannot avail himself of the opportunity of buying or selling futures abroad? Why should he be called upon to run the expense and risk which he would incur by consigning cotton when the same handicap is not imposed on others? A prominent American cotton man recently remarked that "Section 11 of the Lever Bill is a blatant example of class legislation engendered by crass ignorance." It is an anomaly, and should be repealed as soon as possible. When a situation is created—mainly owing to the operation of the Lever Bill—whereby the price of spot cotton in Liverpool advances 6½c. per pound from the opening of the present cotton season to this date of writing, while the price of spot cotton in America advances only 3½c. in the same period, it is surely time for Congress to realize, and take prompt action to rectify its mistake.

	Arbitrage differences.						Spot markets.			
	New York futures.		Liverpool futures. (Comparative months.)							
Date, 1915.	Delivery.	Price. Cents.	Delivery.	Price. Pence.	Difference. Points.	Augusta, Middling. Cents.	New York. Middling. Cents.	Liverpool. Middling. Pence.	Sterling exchange on London, 90 days' sight. $	Bar silver in London. Pence per oz.	Freight on cotton, New York to Liverpool. Cents per 100 lbs.
January 15	May	8.39	May-June	4.66½	94	7.88	8.10	4.80	4.80½	22 13/16	100
February 1	"	8.77	" "	4.88	99	8.06	8.50	5.01	4.81⅝	22⅝	125
February 18	"	8.65	" "	4.87½	110	8.00	8.55	4.95	4.79⅞	22 15/16	150
March 1	"	8.42	" "	4.84½	127	7.75	8.25	4.95	4.77⅝	23⅛	150
April 1	"	9.73	" "	5.56	139	9.00	9.80	5.62	4.76¼	23 9/16	200
May 4	October	10.21	Oct.-Nov.	5.71	121	9.43	10.30	5.50	4.75½	23⅝	125 asked
June 1	"	9.66	" "	5.38½	111	8.88	9.55	5.13	4.74½	23⅜	100-125
June 29	"	9.81	" "	5.39	97	8.88	9.60	5.22	4.70¾	22⅞	100 asked
July 12	"	8.92	" "	5.13	134	8.38	8.90	5.08	4.71½	22⅝	100 asked
August 4	"	9.30	" "	5.39½	149	8.50	9.35	5.36	4.69¼	22 7/16	100 asked
September 2	"	9.73	" "	5.78½	184	8.88	9.85	5.91	4.54	23 5/16	100
October 5	January	13.02	Jan.-Feb.	7.17½	133	12.13	12.75	7.25	4.66	23 15/16	125
November 1	"	11.99	" "	6.85	171	11.75	11.95	7.10	4.58½	24⅛	125
November 16	"	11.77	" "	6.81½	186	11.38	11.80	7.02	4.60¼	24⅝	125 asked
December 1	"	12.44	" "	7.31½	219	12.13	12.55	7.45	4.66	26 13/16	125 asked
December 15	"	12.12	" "	7.36½	261	11.63	12.30	7.50	4.66⅝	26⅜	175
December 23	"	11.78	" "	7.41	304	11.43	12.05	7.63	4.69¾	25 15/16	200
December 30	"	12.06	" "	7.65½	325	11.69	12.30	7.75	4.68	26 3/16	200 asked

Pennsylvania "Child Labor" Law

By Joseph R. Grundy, Bristol, Pa.

THE new Pennsylvania "child labor" law, credit for which is claimed for, and is undoubtedly due to, Governor Brumbaugh, went into operation on January 1. At the time of its passage by the 1915 Legislature this bill was heralded as the most advanced legislation of the sort thus far adopted by any state in the Union. If radicalism were advancement, this would undoubtedly be true, but there are unmistakable indications that insofar as the welfare of the workers is concerned the law is a step backward rather than a step forward.

LEGISLATES MINORS OUT

Ostensibly designed to protect minors between the ages of fourteen and sixteen *in* employment, its actual effect has been to legislate them *out* of employment.

If we may accept as authoritative the constant tirades of "child labor" agitators, and if we may take literally Governor Brumbaugh's statement in his inaugural address that "children under sixteen should not work," this was the real purpose aimed at; but now that it is being obtained through indirect legislation, there is a general disposition on the part of friends of the law to "sidestep."

The Governor and his "child labor" cohorts profess to be as anxious that children under sixteen *shall* work as they were that they *should not* work.

REASONS FOR DISCHARGE OF MINORS

Efforts are being made to create the impression that the wholesale discharge of these juvenile wage earners is merely an indication of the perversity which is supposed to be innate in manufacturers. Public knowledge of the requirements of a manufacturing establishment is so limited that constant explanations are necessary of the reasons why employers, and particularly employers in the fifty-four hour industries, are doing what Governor Brumbaugh hoped for, and now dreads.

The act forbids any minor under the age of sixteen years to work more than fifty-one hours in a week. While the duties of these minors in the textile

industries have been of the lightest character, they are a part of the continuous operations of the mills, and their absence for three hours out of the fifty-four hour work week would mean absolute demoralization of working conditions during those three hours. This is supplemented by a compulsory absence of eight hours more each week for continuation schooling. Thus, the maximum number of hours during which these minors may be employed in a week would be forty-two.

DEMORALIZATION AVERTED

Since it is entirely possible for employers to establish a sixteen-year age minimum in their factories and mills, it is unreasonable to suppose that they would inflict themselves with employes whose presence would disrupt the harmonious operations of their establishments.

All these things were carefully explained to Governor Brumbaugh and to the legislative committees by representative manufacturers of the state. Their arguments were derided and they themselves were subjected to all manner of insults.

PHYSICIAN'S CERTIFICATE CLAUSE VOID

The best clause in the bill was that contained in the article providing for the issuance of employment certificates, in which it was stipulated that no minor between the ages of fourteen and sixteen years should receive employment until he or she had first undergone an examination by the physician of the local school board, who should certify that in his professional opinion the boy or girl would not be injured by the particular employment for which he or she had applied. This clause the manufacturers heartily endorsed, declaring that it was a complete and satisfactory "child labor" bill in itself.

To their amazement and regret, the Attorney General of the state has issued a formal opinion declaring that this one clause is null and void insofar as it concerns all minors under sixteen who may be employed up to and including December 31, 1915. In other words, those minors will work on through the protective period without the only *real* protection that the bill afforded.

I feel safe in saying that there never has been a more lamentable legislative bungle than Pennsylvania's so-called "child labor" law, and unless all signs fail it will rise up to plague the political aspirations of Martin G. Brumbaugh for the rest of his active life.

The War and Continental Textiles

By an English Correspondent

SINGULARLY little news has reached England from Roubaix since the entry of the German army in October, 1914. Dress goods men normally in daily communication with the mills and commission merchants have been without letters for more than a year. The absence of news has two explanations—the difficulties of carrying correspondence out of the city and the absence of any news to tell. It became known twelve months ago that the mills and warehouses and their contents had been seized, that the population lived in sullen silence, and that a number of leading citizens, including several manufacturers, had been transported to the interior of Germany and there interned.

As it was then, so it is now. A textile man who had the great fortune to escape through the German lines in late November has brought the news to date, and his advices repeat what one knew or had the right to expect. The vehicle of communication is his letters, and in the absence of opportunity to examine him on specific points their contents are all that can be given.

Roubaix is still quiet and its people, if not exactly starving, are at all events pinched, lacking all the luxuries of life, and especially lacking contentment. No mills are running, except one or two which the German authorities are operating in their own interests. From the other mills metals and machinery have been taken away and sent into Germany, apparently for melting down to make munitions. All copper has been removed, and the plants could not be worked even if there were raw materials, which there are not. The materials were taken over by the invaders, and Roubaix is living chiefly on its regrets.

DISTRESSING CONDITIONS REPORTED

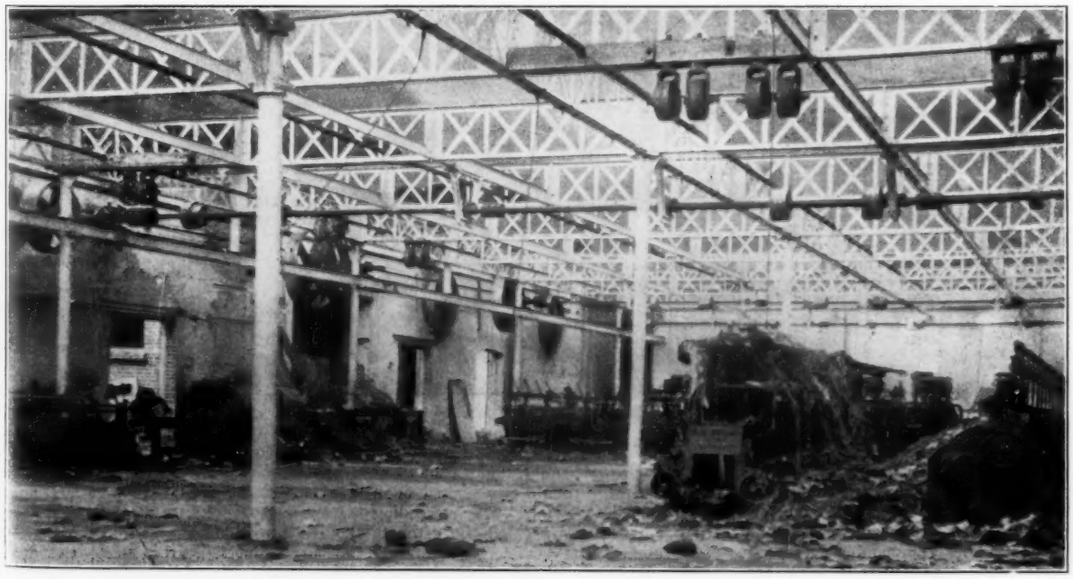
Men in flourishing circumstances seventeen months ago are broken in fortune and in health. Sons who were looked to as the successors in the business have been killed. Two killed and one imprisoned in Germany is the family record of the manufacturer of whom the refugee writes. Others are fighting, and their fate hangs heavy upon minds already depressed. In any event, the owners of industrial property see no good coming to themselves. When the Boches leave they are well convinced that no mills worth claiming will be left behind. The situation of the unfortunate Frenchmen is probably unrealizable by those who have not had to live side by side with armed invaders, and the miserableness of it is indescribable.

THE REMAINS OF AN IMPORTANT FACTORY IN FRANCE NOW IN THE HANDS OF THE BRITISH TROOPS AFTER BEING OCCUPIED BY THE GERMANS. EVERYTHING THAT COULD BE TAKEN AWAY HAS APPARENTLY BEEN SENT TO GERMANY

Roubaix before the war had some 270 mills, providing employment for 60,000 workers, and dyehouses occupying about 10,000 more. It had over 400,000 worsted spindles, a similar number of cotton spindles, 85,000 woolen spindles and 35,000 looms. The destruction of such a center is difficult to contemplate, but there is more than one reason for thinking that its ruin is contemplated. The steps taken toward creating new woolen industries in other parts of France suggest that a restoration is improbable.

WAR ZONE AND TEXTILES

The western front of the war zone is rich in old textile associations. It was in Flanders about the year 960 that the woolen manufacture of the northern nations began, and it spread, much as the war has spread, along the Rhine and into northern France. Edifices like the shattered cloth hall of Ypres are present reminders of the ancient days and of the earlier wars and tumults which ended in dispersing Flemish industry to other countries. Something not unlike civil war drove the industry from town to town. As De Witt says: "The Brabanters did by Laws of Halls, etc., occasion tumults, which issued in murdering the magistrates successively from the year 1301 at Ghent, Bruges, Ipres, Louvain, whence offenders fled, several to England, many to Holland." It is long since Louvain had a textile interest, but men from thence carried the fine cloth trade to the west of England. Louvain had its turn as a textile city,



A DESERTED FACTORY IN ANTWERP. IT WILL BE SEEN THAT ALL THE LEATHER BELTS HAVE BEEN REMOVED

and no unimportant one, as the figures prove. In the early years of the 14th century, 150,000 journeymen weavers worked in and around Louvain, and there were 4,000 master weavers, drapers or clothiers.

SCATTERING OF MANUFACTURERS

The dispersion of the industry proceeded to Châlons on the Marne, from whence shalloon cloths get their name, a place famous for its serges. Campiégne on the Oise, a turning point in the German dash for Paris, was recognized in the 18th century as the source of "a Quantity of Stockins." Abbéville, at the mouth of the Somme, was said to make "the best spun wool of Picardie." Rheims, given up latterly to wool combing, made "Cloth after the Fashion of Berry"; cloth doubtless of the satin weaver, still called Serge de Berry. Rethel lived on the use of the "wool of Champaigne." The French goods of the period 1740 bore names some of which are identified to-day. Ratines, crêpes, baize, flannels, friezes and camlets are known, even if there is a doubt about Baracans, Anacastes, calamancoes and perpetuanas. Fère en Tardenois is the modern name for a small town west of Rheims, called formerly Ferre en Tartanois, with a bygone reputation for wide serges. Was it from Tartanois that tartans got their name, or does it come from the Tirctaines, made at one time at Amboise? In any event, the matter concerns the war zone.

FURTHER ADVANCE OF INDUSTRY

The descendants of the people who made woolen cloth in Flanders made linens after their trade had been thrown and driven away, and proceeded to laces, associated permanently with the name of Valenciennes. They went on to mixed stuffs of worsted and linen, worsted and woolen, worsted and silk, and wars and persecutions drove makers of fancy goods to England. Makers of "lace and fringes, caungeantrus, tufted mockadoes currelles and other goods, mingled silk, saistric or linen yarns," came to Norwich in the 16th century. Walloons from the district of which Liège is the capital brought "new devices called satten cotton or bumbazie, made of silk and cotton wool." Their contribution was not the least important in spreading textile skill. Baillsul, Handschoote and Cassell, which are now on the French side of the frontier, formed part of West Flanders before 1529, and the religious differences of the next thirty years or so drove Flemings to bring their art to England, and to set up in Norwich, London, Canterbury and Colchester the light worsted, stuff or dress-goods trade. The Western front, its foregrounds and backgrounds, are in a very real sense the nursery of the textile industries as America has them to-day.

Wool and the War's Demands

By Our Bradford Correspondent

THE wool trade to-day is up against a very big problem. Europe is engaged in the most terrible struggle that the world has ever seen, and we are face to face with problems which no living man has ever witnessed. A rought calculation has been made that about fifteen million men are to-day confronting one another, all with the object of taking each other's lives! It is desirable to gain a clear conception of the bearing of the wool trade on the war which has disfigured the world for the past eighteen months.

SHEEP RETURNS IN COUNTRIES AT WAR

It is an axiom of war that men cannot fight upon empty stomachs and bare backs, and ever since the outbreak of hostilities it has been the object of the British and allied governments, as well as those of Germany and her allies, to provide soldiers with something really good to wear. Anyone who has carefully examined the outfit of Tommy Atkins must admit that he wears something respectable, sound and good. All his underclothing is quite good enough, shall we say for any man, even King George himself. The writer has had the privilege of inspecting the whole outfit, and from head to foot British soldiers are clad in something really good. All this has meant a big onslaught upon wool supplies, and the value of having ample supplies of raw material has been emphasized again and again. Even the first placing of khaki orders in September and October, 1914, caused values of all crossbreds sensibly to advance, and, although a check came to the upward trend of prices the second week in July, yet when Russia, Italy, and our own War Office entered the market again as buyers, it soon stopped the downward tendency of values and has since led to a material advance. Of course, this was largely the outcome of depleted stocks, there being this year such a demand for wools suitable for the khaki trade that Great Britain alone has been able to consume approximately the whole of the last New Zealand clip, the result being that values have advanced by leaps and bounds.

The writer has been led to consider this subject because of a question raised the other day as to the number of sheep being depastured in the countries of Europe at present engaged in the struggle. On turning to the latest sheep returns we find that the following are the numbers of sheep depastured in the countries named:

	Sheep
United Kingdom	28,500,000
Russia	45,500,000
France	17,000,000
Italy	11,000,000
Turkey	6,500,000
Austria-Hungary	13,000,000
Bulgaria	8,000,000
Germany	5,500,000
Serbia	3,000,000
Montenegro	400,000
Total	138,400,000

The only remark necessary respecting the above is that every country has not only been able to utilize the fleeces of its own sheep, but has been compelled to avail itself of the wool supplies of the outside world in order to meet its demands. For instance, Great Britain has had at her command a large part of the supplies of Australia, New Zealand and South Africa, it being only toward the end of the year that the embargo was lifted and America, Italy and Continental neutrals were allowed to help themselves to wool supplies.

WAR REQUIREMENTS

It is hardly necessary to say that the requirements of the armies at present confronting each other are colossal, and as months pass these wants grow bigger. A rough calculation was made twelve months ago of the probable weight of wool which would be required by the various armies, and although at the time the estimate was looked upon as somewhat "wild," yet succeeding events have fully verified the estimate then made by *The Textile Manufacturers Journal*. Some intelligent and fairly reliable idea of the weight of wool which is to-day being absorbed by the armies of Europe would be enlightening. It may safely be said that the wool supplies of such countries as Germany, France, Austria and Serbia can be ignored altogether, because the weight grown in these countries would be barely sufficient to supply their own armies with one suit of clothes; in fact, Germany with its five million sheep must have had immense quantities of wools from the British Empire to provide its soldiers with even one suit, totally ignoring the wool wanted in the production of all under-garments. Therefore the nations at war must look for their supplies to the outside world, there being only South America outside the control of the British War Office. This being the case, the annual production of wool must be considered, our chief supplies naturally coming from Australasia, South Africa and South America. In the table below the production of the British Isles, being that of 28,000,000 sheep, cannot be ignored. The following is a fairly reliable estimate of the quantity of greasy wool being grown annually in the countries named:

	Pounds.
Australasia	767,041,914
South Africa	174,650,000
The Argentine	268,976,200
Uruguay	14,760,000
Punta Arenas and Patagonia	52,000,000
British Isles	120,000,000
Total	1,397,431,114

WOOL CONSUMPTION

The question of wool consumption or the amount of wool required per head by each man on the battlefields of Europe naturally follows. After reckoning the quantity of wool required in the production of a great coat, a full suit, pants, vest, shirt and stockings, it is estimated that if the materials were made from pure wool, it would require something like 15 lbs. of clean scoured material to complete the outfit of a British soldier. But pure wool is not used altogether. Practically one-

A BUSY CORNER OF THE DISPATCH DEPARTMENT OF ENGLISH WAR OFFICE

third of the quantity required consists of the very best mungo pulled from new serge khaki rags, besides flannels and cast off stockings, and pulled rags from similar materials. The writer has come to the conclusion that, practically speaking, a British soldier is consuming 12 pounds of pure wool in his complete outfit, and a similar estimate for both French, Belgian and German soldiers seems reasonable. Everybody knows that shoddy made fabrics are of little use to stand the strain of a battle-field, and in the production of a great coat or a khaki serge suit, a manufacturer cannot afford to use any more than the quantity of shoddy already named. It is a fact that the outfit of the armies of the Balkan States is not anything like so good in quality as that of English, French, Belgian and German soldiers, but roughly speaking it is probable that the whole of the armies of Europe are absorbing something like 10 pounds per head.

To state a reasonable case, a man in the firing line and in the trenches will easily get through three suits per year, if not more. In other words it means that a soldier is going to consume anywhere from 30 to 36 lbs. of clean wool per annum. If we multiply 36 by 15,000,000 it gives us 540,000,000 lbs. of clean wool which will be required. Of course, in calculating the production of Australasia, South Africa and South America, the figures given are for wool in the grease, and if we reckon this to give a shrinkage of 60 per cent., we get 558,972,800 lbs. of clean wool as the annual production of the countries named. The reader can thus see that there is a very inadequate quantity of wool left from the sources already named to supply the requirements of the whole of the civilian population of the outside world, consequently stocks of raw material have been pretty well exhausted at the advent of the present new clips of Australasia, South Africa and South America.

It is a fact that the armies of Europe, together with the civilian population requirements, have fully kept pace with production; in fact, the war has no doubt been responsible for shifting all surplus stocks that existed previous to the outbreak of hostilities. As the future is contemplated, the requirements of the world to-day seem ahead of supplies, and no one need be surprised if the war continues another twelve months to see a still more pronounced shortage of raw material. Wherever we turn mills are very busy, tremendous numbers are running day and night, consequently consumption was never so large in Great Britain or America, while hungry machines are encountered in Europe outside the war areas, both the Netherlands and Scandinavia in particular being very keen to buy everything of a manufacturing nature.

War Orders Benefit Textile Mills

By One Especially Interested

OF vital importance to the prosperity which has overtaken the industrial situation in this country has been the demand of the warring nations for equipment of various kinds. Of course, orders for munitions have bulked very large and these orders from abroad and the product of munitions factories have been increased in a phenomenal manner during the last twelve months. The textile industry, however, has shared in no slight degree in the business that has come to this country from the Allied nations, and would have come also from the Teutonic forces had the supremacy of the seas not been in the hands of England. It is impossible to give any accurate estimate of the aggregate volume of orders received by textile mills for supplies of various kinds with which the troops in the fields have been furnished. So many manufacturers have had contracts which have never come to the light of day, being obtained in a quasi-private way and for individual specialties, that any estimate is simply guess work, and particulars are absolutely out of the question. Some idea of the extent of these orders, however, may be had from an estimate made by a member of the piece goods market of the value of orders taken by domestic mills on woolen goods and blankets. On the former it is estimated that an aggregate of $44,000,000 has been placed with domestic woolen mills and that blankets valued at between $16,000,000 and $17,000,000 have been bought. The following tabulation is given without any claim as to its absolute accuracy, but from the information that can be gathered the quantities and values, it is believed, are under rather than overstated.

	Piece Goods. Yards.	Piece Goods. Value.	Blankets. Value.
England	6,000,000	$10,000,000	$2,500,000
France	7,000,000	10,000,000	5,000,000
Belgium	1,000,000	1,500,000	2,000,000
Italy	5,000,000	7,500,000	7,000,000
Switzerland	1,000,000	1,500,000	
Russia	9,000,000	13,500,000	

BLANKET ORDERS FIRST

The first evidence of need of supplies came in the shape of blanket orders. Early in October of 1914 the local market was filled with inquiries for mills which could make blankets of one kind or another. These came from all sorts and conditions of individuals, many of whom had no specifications and no idea as to what they wanted. They were simply looking for blanket mills, and the experiences reported were sometimes most ludicrous. Inquiries went to selling agents for fabulous quantities and manufacturers were besieged for information as to the amounts which they could supply and the deliveries which could be made. The lack of results from these inquiries was such that many eventually became disgusted and would not pay any further attention to inquiries unless they came from accredited agents with undeniable credentials. In all this mass of unscientific operations, however, a very fair volume of business was closed and the beginning of what eventually turned out to be a very large business was seen. An estimate which can be given as much credence as those noted before is to the effect that fully 75 mills in the woolen piece goods industry have been engaged at one time or another in the execution of war orders for the belligerents. The majority of these orders have been completed and deliveries made and it is only fair to say that in the great majority of instances little or no complaint has been received regarding the character of merchandise delivered and the manner in which the orders were executed.

UNIFORM CLOTH ORDERS

After the first rush of blanket orders was over for France and England the latter country came into the market for overcoatings and suitings. One of the largest contracts placed was on khaki uniform cloth divided between the American Woolen Co. and the U. S. Worsted Co. This was received about November, 1914, and up to the first of the year these two countries were the only ones that had placed business with American mills. Shortly after the first of the year Russia came into the market and gave a large order about the first of February. A trousering contract was received about the first of March. About that time Belgium placed an order on 6-pound blankets, which were the first of this type to be ordered. Then orders for 24 and 28 oz. khaki overcoatings were received and clothiers who had obtained contracts came into the market for piece goods supplies for England. The latter country placed three distinct orders, one for 2,500,000 yards of heavy overcoatings, one for 500,000 yards of trouserings, then later an additional overcoating order of 2,500,000. It was not until the first of September that Italy made its appearance and her aggregate purchases, as stated above, were for about 5,000,000 yards of uniform cloth. Meanwhile, orders for France had stopped, but Belgium placed business amounting to about 1,000,000 yards and Switzerland for about half a million. Few are now willing to enter into competition for foreign contracts in view of domestic business and the increased prices of raw material, especially shoddy. Business with Belgium aggregated about 1,000,000 yards of uniform cloths as well as about 2,000,000 blankets and about 500,000 shirts. Canada also placed a few orders on piece goods which were made up in Canadian factories into garments. The Italian blankets consisted of light weight three pound as well as nine pound merchandise, while the green gray suitings taken by this country were largely 26 oz., in weight (an order secured in Switzerland by a New York clothier).

TROUBLE WITH FRENCH ORDERS

Among the early operations on war orders the activity of the French created no little attention. Not only in piece goods but in hosiery and underwear was there decided activity in this direction and a species of operations was in evidence which fortunately for the good name of American manufacturers was confined to France and to a comparatively small proportion of the orders placed by that country. These transactions were more or less speculative in that they were the product of efforts on the part of intermediates to secure business from the Government on which they had no bona fide basis for operations, but which they hoped would be accepted officially and on which they prepared various specifications which were not in accordance with army regulations. The result was that a certain proportion of the deliveries made failed of acceptance when they reached the other side. Much was made of this in the daily papers and the claim was advanced that the action of American mills reflected discredit upon the name of American merchandise. With one or two slight exceptions, however, this charge was proved later to be absolutely unfounded and the responsibility was found to rest entirely with the individuals who endeavored to obtain business through their supposed relations to army officials or Government functionaries who had never placed orders but who were hoped to be sources of business. Another cause for criticism was that the prices which the French Government paid were found to be exhorbitant and this was again laid at the door of American manufacturers. It was likewise discovered, however, that the fault again was with the self-appointed commissionaires on the other side whose profit on the transactions no one ever knew, but which, undoubtedly, was far in excess of any margin obtained by manufacturers.

LITTLE PROFIT ON EARLY ORDERS

As a matter of fact, the bulk of early orders taken by domestic mills was accepted at figures that did not admit of any normal margin of profit. They came upon the industry at a time when mills were badly in need of work and were accepted to keep machinery in operation. It was not particularly a question of profit but of employment of operatives. This lasted for some months or until the time when raw material advanced to a point where it was necessary to make a decided increase in quotations. Where it was possible for manufacturers to provide for their requirements on a moderate market the profits obtained during the last part of the war order period have been eminently satisfactory. Where, however, no forethought was exercised and manufacturers were compelled to pay the advanced quotations on raw material and supplies there has been little satisfaction to the business transactions in which they have been involved.

CLOTHIERS INTERESTED PARTIES

One feature of the piece goods business in overcoatings and suitings has been that a very fair proportion have given an opportunity to the clothing manufacturer to become interested. It is estimated that practically 30 per cent. of the woolen piece goods ordered by the belligerents have gone out of this country in the shape of uniforms or overcoats. Practically all of the Italian and English orders have been made up in garments. Outside of the loose methods pursued at the beginning by the French, operations have been conducted in a businesslike and systematic manner. Buying commissions have come to this country, have known exactly what they wanted and arrangements for financing transactions with highly responsible banks or trust companies have been made so that the seller ran no risk in accepting business. It is the testimony of those who have been interested in a large number of these contracts that the examiners who have been sent here from abroad have been fair and unbiased in their actions. A high grade of material has been furnished and even where inferior specifications have been proposed the resulting cloth has been of intrinsic merit. These cheaper fabrics made up into loose garments abroad with three or four pairs of trousers to one coat, it is believed, have given eminent satisfaction and have caused little complaint, as to the efficiency of the American manufacturer.

ORDERS COUNTERMANDED

Certain large orders from England and Russia were expected a month or two ago, all details having been arranged except the absolute signing of the contract. The fact, however, that English mills had arrived at a condition where they could take additional business caused considerable criticism in official circles in Great Britain, with the consequence that the transactions were called off and business placed at home. Not only did English contracts fail of consummation, but business from Russia amounting to 5,000,000 yards or more has been taken by English mills which it was thought would be placed in this country. Whether additional business is to be given or not remains to be determined. It is rumored that the same clothiers anticipate securing another contract from Swiss sources. Problems with which American manufacturers are confronted are such that

(Continued on page 233)

Textile Alliance and Wool Imports

By a Well-Known Authority

OF the problems connected with the European war none has been of greater importance than the receipt of supplies formerly furnished this country by the belligerents and which owing to the handicap of hostilities, the interruption of traffic, the decreased production abroad, together with the increased needs of foreign countries have been difficult if not impossible to obtain. The problems that have arisen in connection with almost all of the commodities imported from abroad have been stupendous and their solution in many cases only partially worked out. The difficulty of securing supplies for manufacturers' needs have brought about an acute situation in more than one quarter and in more than one division of the textile industry. This situation has in instances been modified, but in others, as for example that pertaining to dyestuffs, remains as difficult and embarassing as ever for the domestic producer.

WOOL COMPLICATIONS UNEXPECTED

With regard to wool few expected at the beginning of the war that any difficulty in supplying the requirements of domestic manufacturers with foreign grown material would be an appreciable factor in the situation. It soon became apparent, however, that the increasing necessity for crossbred wool on the part of English manufacturers in the production of uniform cloths and the need of Germany for wool of all kinds would bring about action on the part of Government authorities looking, in the first place, toward a conservation of crossbred wools for British consumption and in the second place toward prevention of supplies from reaching the enemy. The situation culminated in the so-called Orders in Council passed by the British Government which declared wool contraband. The effect of such a pronouncement upon the wool manufacturing industry of this country was at first little realized and it was expected that an early modification or even a reversal of the action would be announced. When, however, it was realized that the policy of England was to starve out, if possible, the enemy by preventing the reception of any oversea materials from neutral countries it was appreciated that it would be necessary to make arrangements by which this country could receive merchandise that was necessary for the maintenance and continuance of the industry in conformity with the regulations which had been laid down by the British Government. In consideration of methods by which a result could be accomplished it developed that some organized body would have to take upon itself the responsibility of seeing that merchandise shipped into this country did not find its way eventually into the country and hands of Germany. Those who were actively engaged in the solution of the problem were at a loss to make such a selection and it was not until the Textile Alliance so-called, was brought into the limelight by activities in other directions that the proposal was made that this organization should act as the intermediary through which manufacturers' raw material could pass and be distributed to consumers in this country.

When discussion of the proposed plans for utilizing this body as the means by which the English Government could satisfy itself that wool from the British Isles or from British colonies would not be transferred from the original purchasers to those who might in turn dispose of it to the enemy, the questions naturally arose, What is the Textile Alliance, and what are its credentials? Comparatively few in this country outside of a limited number of woolen manufacturers and sales agents had ever heard of the Textile Alliance or knew anything about its aims and purposes. It had its origin in something entirely separate from the importation of wool and when it was established no idea of engaging in international trade was ever dreamed of. Back in the early months of 1914 a report of the American Association of Woolen and Worsted Manufacturers gave the details of the formation of the Textile Alliance and its purposes. At a meeting of the Association in New York in December, 1913, a lengthy report of what was then known as the Dyestuffs Committee of the Association was read and printed forms were distributed to the various members. For months this committee had been working on a plan for the prevention and reformation of abuses in the manufacture and sale of mill supplies, especially dyestuffs. The Association through this committee had been instrumental in inaugurating suits against certain dyestuff distributors, alleging fraud and corrupt practices in the sale of these materials to various manufacturers. These suits had attracted considerable attention in the textile industry and although the final outcome of the majority had not been decided yet sufficient had been done to warrant the prophecy that a very helpful work for the improvement of commercial practices in the textile industry had been begun with great promise.

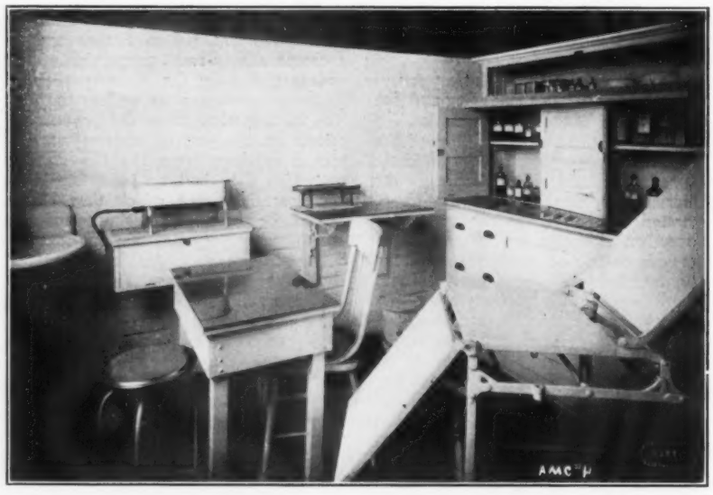
The suggested method for the perpetuation of this work was the formation of a committee made up of an accredited representative of each of the five leading textile associations. This committee was organized with the following members: John P. Wood, representing the National Association of Wool Manufacturers; Ceasar Cone, representing the American Cotton Manufacturers Association; W. A. Mitchell, representing the National Association of Cotton Manufacturers, and A. M. Patterson, representing the American Association of Woolen and Worsted Manufacturers. In February, 1914, this committee incorporated as the Textile Alliance, Inc., with the above named members, together with J. J. Nevins, Secretary of the American Association of Woolen and Worsted Manufacturers, as directors. It was hoped that the Alliance would succeed in interesting the Federal Government to take some action relative to the abuses in the sale of dyestuffs and it was also determined to adopt some method of policing the industry in the hope of preventing practices which had grown into public scandals. The activities of the Alliance brought about a reduction in the price of dyestuffs which meant a very considerable saving to domestic manufacturers. At a meeting of the Alliance held April 15, 1914, the following officers were elected: President, A. M. Patterson; Vice-President, Ceasar Cone; secretary-treasurer, J. J. Nevins. At this meeting Dr. August Hunziker was nominated by the Silk

(*Continued on page* 134)

First Aid for Mill Employes

By An Authority in the Trade

THE installation of "First Aid" rooms in a number of important textile mills in New York State is an interesting development of the Workingmen's Compensation Insurance Act. The American Mutual Compensation Insurance Co., which carries workingmen insurance for many manufacturing plants, has started a campaign for the more general adoption of first aid service to employes and under its direction a number of important mills are installing first aid rooms. The company, through Harry F. Burns, the manager of its engineering department, is also conducting a course in first aid service for the purpose of educating a trained attendant for each mill in which its first aid system is installed. The proposition is the outcome of the trend for greater business efficiency and economy in meeting new items of expense, but it lines up with other measures of welfare work which are becoming so important in the general management of manufacturing plants. It has been found that the health and welfare of employes actually means more dollars and cents to their employers.



FIRST AID ROOM IN ONEIDA KNITTING MILLS, UTICA

TRAINING OF ATTENDANTS

The trained attendant is a vital adjunct to first aid service and in Utica a class for the training of these attendants has already been brought to a successful conclusion. The class, begun last summer, ran for a period of 23 weeks, meeting one night each week. The text book used is a manual of instruction on first aid issued by the American Red Cross Society and compiled by Major Charles Lynch, Medical Corps, U. S. Army, and First Lieut. M. J. Shields, of the Medical Reserve Corps. Lectures and practical demonstrations convey to the members of the class the best methods of administering first aid to the injured. Various chapters in the manual take up such matters as—bruises, strains, sprains, dislocations and fractures, wounds, hemorrhages, burns, shock, poisoning, apoplexy and sun-stroke. Instruction is given on handling first aid materials, such as bandages, compresses, plaster casts, splints, tourniquets and stimulants, and there are lectures on the structure and mechanics of the body. At the close of the 23 weeks' course the candidates are subjected to an examination under the direction of the U. S. Army Medical Corps, which they must pass at a certain grade before they can take up work in connection with the first aid rooms of their respective mills.

The class held in Utica graduated 25 men, and among the textile mills with which these graduates are connected are the Skenandoa Cotton Co., the Utica Steam & Mohawk Valley Cotton Mills, the Oneida Knitting Mills, the La Tosca Knitting Co., the Mohawk Valley Cap Factory, the Oneida Bleachery, and the New York Mills, all being situated in Utica except the last two, which are at New York Mills, N. Y. On Dec. 20 a similar class was started at Syracuse with an initial attendance of 37. Harry F. Burns, of the American Mutual Compensation Insurance Co., delivered the first lecture with stereopticon views on accident prevention, showing the danger of unguarded gears, shafting, elevators, etc. Dr. Geo. H. Stephens will conduct this class, which meets one night a week for 23 weeks. At the first meeting several Utica manufacturers were in attendance and they spoke enthusiastically on the success of the scheme as it had been tried out in their own plants. H. J. Keating was elected president of the Syracuse organization and H. J. Hilfinger, secretary.

The photograph on page 205 shows the class at Utica and among the textile men are, Mr. Crocker, of the Mohawk Valley Cap Co., at the extreme right of those who are standing, Mr. Leiper and Mr. Young, general superintendent and agent respectively of the New York Mills on the left of those seated. In the selection of a candidate for first aid attendant an office man is preferable, and in many cases members of the manufacturing firms themselves took the course.

VALUES OF FIRST AID SERVICE

Adoption of the first aid service with attendant and specially equipped room as recommended by the American Mutual Compensation Insurance Co., results in the saving of 2 per cent. on the insurance rate. It has been estimated that in the average plant there is a 5 per cent. loss of time due to the minor injuries which are continually happening to the employes, while under this first aid system the loss of time has been reduced almost to nothing. Instead of the wild excitement incident to the arrival of an ambulance, the injured employe is quietly removed

(*Continued on page* 205)

Textile Machinery Safeguards

By H. W. Nelson, Philadelphia

WHILE there is so much talk of safety first and preparedness to the fore (of which quite a part is of an irresponsible and ill-considered nature), it may perhaps be well to discuss in general terms one phase of the subject in which the textile industry is concerned; namely, the safeguarding of textile machinery.

"The Workmen's Compensation Act of 1915," which became a law of Pennsylvania this first of January, imposes on the employer of labor very stringent terms in case of accident to a workman. So severe are the potentialities of the financial penalty demanded of the employer that it would be an insupportable burden without the aid of heavy casualty insurance. Manufacturing costs of production could never be definitely determined upon so long as this possibility of extra expense remained suspended in its uncertainty as a sword of Damocles. For it may be positively asserted that, with all the safeguarding which human ingenuity can devise, accidents will continue to happen in textile mills. Crass ignorance and disobedience are almost wholly, one might say entirely, the factors that bring about personal accident in our factories. Ignorance is the lesser evil and can be more or less successfully combated, but disobedience is incurable. It might be remarked in passing, with a large degree of truth, that the higher the intelligence of the workman the greater his disobedience; that is to say, he will take more chances in respect to bodily harm to himself, however conscientious he may be in the consideration of dangers toward his fellow workmen. "All men think all men mortal but themselves" is not only a fatalistic but a fatal doctrine when it comes to neglect of obedience to the rules for the operation of machinery, a wilful failure to employ the safety appliances provided.

However, "it is a condition that confronts us—not a theory," and what is to be done? Is there anything further that can be done in mechanical device to protect human life and limb?

SAFETY FIRST A HUMANE PROPOSITION

Employers of labor in America, with few exceptions (we speak of textile mills with which we are familiar, although undoubtedly the same thing obtains in other industries), have first and foremost considered this question of safety for the workmen against accident on its humane side. It is not only idle, but illogical, chattering for certain youthful college professors and other well-meaning, inexperienced zealots to claim otherwise. The very fact that employers of labor are just ordinary, plain, unvarnished individuals, "even as you and I," and not a breed of ogres especially raised for their callousness, is surely sufficient logic for the argument. It really would seem that at times our big, practical men of affairs should themselves be protected by some form of safety appliance against people who mean well.

It may be accepted as fact that textile machinery is safeguarded, and has been so for many years. Experience and observation have, of course, as a matter of progress, introduced modifications and improvements in the methods of guarding danger points, and in the designing of the guarding apparatus. Unfortunately, some of these experiences were bitter ones; places which ordinary foresight could not regard as dangerous turned out to be so. To-day it would be difficult to find a spot on a machine that presents the remotest possibility of danger that is not guarded in some way. Often in an excess of caution the remedy itself has created a danger point, so that in attempting the solution of these problems of safety one must guard against the danger of absurdities. A facetious foreman in one of the mills recently remarked that he could not see that any more safety-first frills could be added to his machines, and that the next thing to do would be to lock up the machinery in the office safe and have him produce his goods through the combination. Even then there would be danger of the help putting fingers in the combination.

The economic side, although secondary to the humane, is nevertheless of fundamental importance, and actually cannot be considered separately. When attempted it almost invariably introduces, especially when the sentimental has the lead, rules and regulations which are ludicrously impracticable or which are not satisfactory to both sides.

GENERAL SAFEGUARDS

To come down to particulars anent the protection against bodily injury in textile mills. We have the consideration of the danger points in respect to the power transmission plant, textile machinery, causes for fires, facilities for exit in case of fire in order to forestall the consequences of panic, fencing off openings to elevator and air-shafts for different purposes, guarding the operating mechanism of elevators, and protection against doors and windows opening direct into space through which goods are loaded or unloaded by means of cat-head, tackle and falls, whereby employes might inadvertently walk to their injury. All these clauses, and others that might be mentioned, are, with the exception of textile machinery, common to nearly all factories, and each requires individual attention distinct from the present writing.

SPECIAL TEXTILE SAFEGUARDS

Textile machinery in its safeguarding deserves, and in truth demands, a separate report for every class of machine, specified in exact detail. This obviously would be entirely too voluminous and out of order for this article. Specifications of a machine for spinning worsted yarns would not coincide with those of the loom which might be used in weaving the yarn into a fabric. Neither would the knitting machine details dovetail in with those for spinning and weaving. Each is sovereign in its own kingdom and insists on its sovereign rights. Then, also, there are the preliminary, accessory and finishing processes associated with these three big divisions, each requiring machinery after its kind. Again, each division has its class distinction where caste is rigid. A machine that has been thoroughly well brought up on the wool fiber does not associate with those which deal with cotton. Woolen and worsted yarns, although cousins german, are not always neighborly, and silk, jute, flax and ramie fiber are in no wise kin or acquaintances.

In view of this it may be clearly seen that the problem of establishing a scientific system for the guarding of textile machinery is one that must be solved by practical men familiar with the processes from each of the classifications indicated. We may, however, venture to trespass into all these divisions by way of summary.

GEARS A DANGER POINT

One of the agencies in the operation of most of the textile machines is gearing, which may include either or both toothed wheels engaged directly or with other toothed wheels or sprocket wheels connected by linked chains. It is apparent that acutely dangerous places are presented where gear teeth are running inwards together, or a link-chain is running on to the cogs of a sprocket wheel. In gearing that revolves quite slowly or that transmits only a trifling amount of power, though the chances for injury may be almost negligible, the principle remains that gearing should be insulated in some way from contact with the body or loose garments of the operatives. Under some circumstances this may be acomplished by entirely casing-in the whole group of gears, but often the operation of the machine necessitates a continual immediate accessibility to certain gears in the group. These conditions have been cleverly met in several ways, sometimes by a fence made up of an iron framework with sliding or swing panels, or with hinged iron all-embracing covers, or by other means.

OTHER ELEMENTS OF DANGER

There are plain pulleys, drums and cylinders driven by driving leather or cotton belting, revolving at high rates of speed. These must be guarded, both wheels and belts, against the careless person walking into them, also against the careless or reckless workman who migh put a hand or arm between the spokes of the wheels or the intake between the belt and the face of the wheel.

Again, there are parts of a textile machine, itself stationary, which travel forward and back on a runway or have a quick swinging motion; movable parts known as scrolls and cams actuated by intermittent motions, cotton banding or iron lever-arms. These contain elements of danger and require some method of safety guarding.

Even in so brief a summary it can be seen clearly that one general set of rules cannot be formulated to cover all cases, but that, on the contrary, the problem is one for experts, and each to his own machine. Experts, however, differ, and that materially. Although perhaps half a dozen different treatments of the same case may each, individually, effect a satisfactory cure, yet from the point of economy and efficiency the result is anything but good. State governments cannot send out factory inspectors with clear-cut, definite instructions. The departments having charge of these industrial conditions accumulate a mass of both professional and amateur advice and suggestions in this conection, out of which they try to elaborate a set of regulations equitable for all concerned. As a general thing the attempt is a failure; it is neither fish, flesh, fowl, or good red herring. Factory inspectors and mill managers are matched up in a sort of neutral belligerency, each trying to do the right and dutiful thing, but largely at cross-purposes in the doing of it.

Even if one state is able to work out a set of rules and regulations that operate smoothly and effectively, its commands cannot be appropriated as precepts by those unfortunates who provide the machinery and who are told in light and airy tones by the mill manager, after he has ordered the machines he requires, that everything must be "absolutely guarded." The builder of machinery under the demands of to-day really is not permitted to use his own discretion and experience for these specifications. In addition to the fact that all this extra material is more or less costly, it is true that what might be supplied and found acceptable in one case might easily be rejected in another, in that it did not meet the ideas of the factory inspector of that territory.

CENTRALIZATION OF STANDARDS

With the foregoing in mind, the remedy that must suggest itself is the centralization of standards. This undoubtedly could be comfortably worked out by the various national associations of the textile industry, each in its own sphere of influence. Just to name five of the societies which readily occur to one. The National Association of Wool Manufacturers, the American Association of Worsted and Woolen Manufacturers, National Association of Cotton Manufacturers, American Cotton Manufacturers Association, and the National Association of Hosiery and Underwear Manufacturers could each appoint a commission to draw up a report of what the association would recommend as the most complete system of safeguarding the machinery employed by the manufacturers within its membership. Each of these commission reports would undoubtedly be accepted gladly and adopted by every state government as the last word in safeguarding in its particular line.

Methods of Textile Cost Finding

By W. A. Tucker, New York

ONE of the most important factors in determining the price at which any article should be marketed is not so much the cost of the raw materials which enter into its manufacture, but the cost of conversion from raw material to finished product. The first item is a factor that in nearly every instance can be arrived at with a considerable degree of accuracy in the manufacture of almost any article, but there are such a variety of elements that enter into conversion costs, causing them to vary from time to time, that it requires no little skill to secure results that are even approximately accurate. In no line of business does this hold true more frequently than in the manufacture of woolen goods, particularly those made on the carded system.

The manufacturer of worsted cloths has a more definite basis on which to figure his costs as his raw material, in the form of yarns, ready for the dressing frame or loom, are purchased on a certain definite basis, a recognized number of yards of yarn per pound at an agreed price. Any substantial variation from the size, and therefore from the yards per pound, can be very readily detected, and due allowance obtained therefor from the yarn spinner or dealer. From a certain weight of yarn it is possible to figure very accurately the yards of cloth that may, or should be, produced, provided that due care is observed in the processes of manufacture, so that excessive waste does not occur in any department.

WOOL GOODS COST VARIATIONS

On the other hand, the manufacturer of carded woolens has not an equal opportunity to ascertain the cost of the materials from which his fabrics are made, due in some measure, it may be, to lack of care in keeping his cost records, but more largely due to the fact that there are such numerous opportuni-

ties for invisible losses of various kinds. It is not at all a difficult matter to determine the cost of a stock mixture as it is laid down at the picker, but it is unfortunately true that in many mills this item is well-nigh the only factor in the cost of the yarns that is known with any degree of certainty.

With vastly increased competition, daily becoming more severe, that has developed in recent years, it is becoming more and more evident that the woolen manufacturer must bring his business more nearly to the basis of an exact science. Just how this may be accomplished is a question that is receiving much more attention at the present time than at any period in the history of the industry. Textile arithmetic was long considered more or less of a mystery, and there were relatively few who were competent to figure the cost of textile fabrics of any kind. Gradually manufacturers have come to realize that their continued prosperity is dependent, in large measure, on having in their employ those who are conversant with the theory as well as the practise of manufacturing, and as a result there are but few "secrets" in the modern mill.

ANTIQUATED SYSTEMS USED

It is a matter of some surprise, however, to find that there are even in this enlightened day, many manufacturers who have not availed themselves of the information so broadly disseminated relative to methods of ascertaining conversion costs, still using systems of cost finding that have proven to be grossly inaccurate. For this there is certainly no excuse, as there is abundant opportunity afforded every one to acquire information along these lines.

NEED OF ACCURACY

Possibly one reason for the persistence of these erroneous methods of ascertaining costs is the fact that in times past, when the margin of profit was greater, an error of a few cents per yard made no material difference aside from diminishing the profits, but at the present time an error of the same proportion might easily result in placing the fabric sufficiently above the market level to prevent a satisfactory distribution, or, if the error is in the other direction, in eliminating all possibility of securing a profit. It is very improbable that any system of record keeping and cost finding can be devised that would meet the approval of every manufacturer and fill the requirements of every case, but it is entirely within the bounds of possibility that a system can be devised that may be used as the foundation upon which may be built an adequate and accurate system applicable to the requirements of any woolen or worsted mill.

ELEMENTS OF SUCCESSFUL SYSTEM

The ideal system, of course, is that which keeps in convenient and readily available form all the data relative to the production and cost of the various fabrics produced at various times, but without entailing an undue amount of clerical work. In fact, it is as easy to err on the side of over-systematizing and excessive records as it is in keeping less than may be required, and in certain instances this has occurred, making it necessary to search through a mass of data that is entirely useless in order to secure the desired information. An experience of this kind is calculated to make the office manager look askance at any proposition to introduce another system however meritorious it may be.

In making an estimate of the cost of any woven fabric it is customary to begin with the finished goods, working back to the raw material. This we are inclined to believe is the chief cause for one of the most prevalent errors in cost figures, both those in the mill and those published from time to time. The mistake usually made is in considering the finished goods as the base of the calculations, whereas, the true base of the figures is the raw material, be it yarn, as in the case of the mill which weaves only, or raw stock as in the case of the carded woolen mill. A mistake commonly made in the calculations to determine the weight of yarn required to produce a yard of cloth is in figuring the take-up in weaving. In many cases the amount of take-up has been estimated correctly or approximately, so, as far as the percentage is concerned, but in figuring the weight of yarn or yards required, an error is made in considering the finished weight as the base. For example: A fabric is made with 2,400 inches of three-run yarn in the warp. The obvious method to be employed in ascertaining the

(*Continued on page* 145)

Progress of English Color-Making

By an English Correspondent

THE main progress that has been made in the tar color industry in Britain during the war is a bricks and mortar progress. Land has been bought, railway sidings have been erected, premises have been enlarged and new plants have been more or less fully equipped. It can be added also that processes new to English practice have been worked out. At the favorable moment British color making will in all human probability leap ahead, but the moment is not at hand and dare hardly be expected this side of peace. England, meanwhile, lives for war and warfare consumes precisely those bases and reagents that are requisite for tar colors. The production of derivatives like benzol, toluol and phenol has manifestly increased since August, 1914. The production of acids is unquestionably much larger and so large that over-production will almost certainly be heard of later. Were the output of bases and reagents twice as great as it is to-day it would doubtless still be the case that the military authorities would close their fingers on it. War knows no limits and no restraints in the consumption of material and the consequence is that the color-maker is incapacitated from doing what he naturally would and what he eventually will.

EXPLOSIVES VERSUS COLORS

Explosives come first and although it is not exact to say that colors are negligible, they form a very belated second. High prices would be, and are, given for materials, but the supplies are literally beyond price. Not price but permission bars the way and it is not suggested that British Dyes, Ltd., an undertaking which is rather more than half a Government concern, finds it any easier than the independent manufacturer to buy the indispensable supplies. Not altogether in jest, one of the outside color manufacturers has proposed the taking of a holiday and placarding his premises "Closed: Apply to Government for Explanations." The step has not been taken yet and conceivably will never be taken, but without much effort one may enter into the feelings of the English manufacturer. Munitions are indispensable, but dyewares are indispensable too for the maintenance of the export trade and the essential domestic needs of the nation. The demand for dyes is for practical purposes unlimited and the market cannot be met. The position is sufficiently disheartening even when it is reflected that neither can anybody else supply more than a fraction of the legitimate demand.

ADVANCES IN MATERIALS

It has been said that materials are dear. For example, sulphuric acid costs four to five times its accustomed price. Carbolic acid, or phenol, formerly seven cents, now costs thirty-one, and the fact that the authorities ever allowed its price thus to be run up against themselves is a grievance. Naphthalene, for which the old price was five pounds a ton, now costs thirty. Phenol is wanted for lyddite as is dinitrochlorbenzol. Toluol is wanted for T. N. T. and benzol is employed for automobiles on war service. The detail need not be pursued further. Reduced to essentials by a practical manufacturer the position comes to this: "Coal tar splits into say eight substances. Six of them are commandeered. We can't do much with the odd two, can we?"

Consumers have been looking forward to a date some time earlier than the end of the war at which colors should become more plentiful and cheaper. That date is not in sight and the conviction of those who are making dyes and selling them at prices that are moderate as compared with those which dealers ask, is that while the war lasts colors will grow scarcer and dearer. There are no signs to the contrary. The production is much less than the demand. With the increasing size of the armies and the growth of gun-power, the consumption of explosives must naturally be greater and there are no prospects of getting for the use of industry more than the irreducible minimum of color. The proceedings of the Advisory Committee, composed of the principal consumers of dyestuffs, are not published, but the tenor of the remarks of the speakers at its recent meeting in London is known. This committee, whose business is to negotiate the liberation of tar products and chemicals for the use of industry, itself puts munitions first and takes an altogether less aggressive line than some dyers and some dye-makers would like.

LITTLE HOPE OF NEW COLORS

Just as there is no hope of getting materially larger quantities of dyestuffs at present, so is there none of obtaining new products. Makers have far too much to do in supplying the colors that they have made regularly to think of handling new lines of goods. Our illustration will serve to establish the point. A dyer whose normal consumption of a staple color is five tons a week, and whose needs command every attention on the part of the suppliers, is able to draw from the largest color works in the country only one cask a week. While this, or anything resembling this condition obtains it is perfectly pointless to count upon a time at which there shall be a surplus and when new and fancy articles can be attempted. When the war ends, when the consumption of the explosives market decreases, when the normal offtake can be met, when stocks are replenished and prices begin to fall, there may be solid grounds for expecting new departures in British color-making. Meantime, there is more serious work on hand.

From one point of view, the outlook for consumers appears bad enough, but the position is not without its compensations. Admitted that color is deplorably scarce and dear, and that as much as 78/6d. a pound has been paid for 200 pounds of patent blue normally costing 1/3d., it is not so sure that the purchaser fared badly on his transaction. If he bought dear, he sold dear to a government which would not permit the use of logwood or any alternative color. For more than a year past dyers have disclaimed all responsibility for the fugitiveness of their dyeing, and have not contracted to do more than give an approximate match in shade. With these prolific causes of debit claims removed, dyeing immediately becomes a much better business. Thus in the days when dyes were bought at sixpence a pound, dyers may be said to have given the dye away. The actual color cost perhaps three per cent. of their bill, and now that it costs more they make a profit on the extra cost. "A lot of our dyers," says one with long experience of the trade, "want no more good times. Bad times are plenty good enough for them." Counting that the dyer keeps very busy, can sell dear color dearer still and escape the usual penalty for poor dyeing, he can do well temporarily, and there is evidence that many are faring far from badly.

POLICY OF BRITISH DYES, LTD.

The British color maker is not obtaining these fancy prices, although with the rise in Swiss prices English quotations will naturally go up. The dye manufacturer realizes that he will have to live in the future, and that it is fatally easy to make enemies now of those who should become his supporters in other days. So far as British Dyes, Ltd., is concerned, its policy was outlined by the chairman some months ago. Mr. J. M. Falconer is quoted as saying that, in regard to the question of immediate supply, the board had laid down a rule that any question of profits was an entirely subordinate consideration, and that the real, primary, and perhaps only important, question was to secure a supply of dyes for the country. He did not mean that they were going to sell dyes at a rate which would not be remunerative, but in deciding what to make, in deciding whether they were to make it themselves or to supply material to other people who could make it better . . . they would place first not their own interests, but the interests of consumers of this country and of the shareholders and leave profit to look after itself. . . . They could not divide beyond 6 per cent., and whatever they did make would be saved to help establish a national dye industry.

A CO-OPERATIVE VENTURE

Whatever else may be thought of British Dyes, Ltd., it is, at any rate, a highly interesting venture in co-operation between the state and the textile industry. The capital is provided jointly by both, and the output is allotted pro rata to the subscribers in accordance with the amount of their subscriptions. Some who have subscribed little make a grievance out of the circumstances that they do not receive much in response to the orders that they send in weekly for large weights. Consumers have not uniformly made admission of the point that it is a considerable privilege to receive dyestuffs at all in a time when the total demand can be only imperfectly met. Failure to appreciate this point apparently explains some of the grumbling that is heard, but it is evident from a comparison of prices that those who are receiving supplies are securing a return for their money, irrespective of any ultimate dividends. The quantities received are proportionate to the subscription of capital, the real consumption of the individual and the scale of production which the prices charged do

bear some recognizable resemblance to the working cost of making dyes out of abnormally dear materials. Customers of the company are getting for 44c. a direct fast yellow for which one dealer in his price lists asks $3 and a standard yellow for which $4 is quoted in the same list. For acid red, for which the company charges 90c., a price of $5.75 is asked. The lower prices are for concentrated dyes of the regular strength, while the higher ones are, in some instances, quoted for what is called "tooth-powder," i.e., dye heavily diluted with salt. The extent to which a customer benefits depends, in part, on the length of time for which abnormal prices last. Meantime, the savings are substantial. The independent producers make their own bargains as to prices, and there is something to suggest that when they do sell dyes for resale they charge upon a different scale than in dealing with their old customers.

Estimates vary as to the extent to which consumers depended upon imported dyestuffs before the war, but, in any case, the proportion was approximately 90 per cent. The gap has had to be filled with logwood and fustic, and such enlarged quantities as the half-dozen British firms could manage to turn out. In spite of their difficulties they have increased their output, and it has been authoritatively stated that the Read Holliday branch of British Dyes, Ltd., in the first nine months of this year, made more than twice as much dyestuff as in the corresponding part of 1914. Producers have had incentive to make every ounce of which they were capable, and there can be no doubt that the volume has increased. At Turnbridge, Huddersfield, the works of Read Holliday & Sons covered, a year ago, about 150 acres. The premises have since been nearly doubled, the addition of a large acid-making plant accounting for much of the extension. Plant normally available for color-making has been occupied by explosive compounds, so that not only outside the color works, but within them, has the new demand for nitro-compounds interfered with normal work.

EXPANSION OF ORIGINAL PLANT

The Read Holliday works have served as a nucleus for British Dyes, Ltd. They have been enlarged in every respect, and there is a new air of bustle and importance all around them. The extensions, which will eventually convert a concern employing 750 men in 1914 into one engaging 10,000 workers, are proceeding at some distance. A site of 250 acres has been acquired, and an adjacent 200 acres is being taken on to avoid annoyance to neighbors. Up to the present little more than the preliminaries have been performed. The site has been marked, huts and buildings have begun to appear on the ground, and, as contracts have been let for $1,250,000 of construction work, further visible changes are to be expected soon. The site is served by trunk railroads to which connections will be made. A canal is at hand, providing barge transport to either coast. The site is about equidistant east and west from the sea, and in the center of the area in which dyes are principally consumed. The local water is soft, there is coal under the site, with small coalpits and fire-clay works close at hand, while the large Yorkshire and Lancashire pits are within

(*Continued on page* 123)

Australian Classing of Domestic Wools

By James E. Cosgriff, Salt Lake City, Utah

DURING the spring of 1915 there was erected by the Pioneer Australian Shearing Sheds Co., six miles south of Bitter Creek Station, Wyoming, the first modern shearing shed ever constructed in this country. The operation of the plant was so successful and so far exceeded the expectations of the owners that, in the hope of advancing the interests of the sheep industry, they issued and mailed a booklet to the sheepman of the Inter-mountain States, setting forth the advantages of the system and the satisfactory results obtained.

It may appear almost startling to the man who has never given the subject serious consideration to learn that even the largest sheep companies of the Inter-mountain States, with perhaps a quarter of a million dollars invested, have conducted their shearing operations in miserable makeshift plants costing a total of but a few hundred dollars. Their shearers and other help are without comfortable sleeping quarters, without means of taking a bath, and without a laundry for clean clothes. The sheep have been without shelter, exposed to the merciless storms and winds after having been shorn of their fleeces. The brutal treatment at the time of shearing has been such that humane societies have taken steps to punish the offenders. In these pens a fleece of wool has been treated as if it were of little value. With utter disregard of any difference in quality of the wool shorn, the entire fleece and filth attached have been tramped indiscriminately into a sack, from which the foul ordor emitted has proclaimed the character of the work.

REAR VIEW OF BITTER CREEK PLANT, SHOWING SHEEP GATHERING PENS

DISCUSSION OF NEW METHOD

That the revolution proposed by the new method has awakened controversy among sheepmen and manufacturers is not surprising. The greater the need of reform, the more the opposition. To the sheepmen who have read the booklet issued by the company there is nothing further to be said, but to the readers of the TEXTILE WORLD JOURNAL the views of one who assisted in the establishment of the new sheds upon the question of the preparation of wool as affecting the interests of the manufacturer may be of passing interest.

The first adverse criticism heard was that the cost of shearing and packing was prohibitive, and surprising as it may seem, these critics professed to know the cost long before the owners did. The cost of shearing and properly classing and packing the wool per head is actually less than the cost of shearing and sacking in the old way. It is simply the question of system and order bringing better results at lessened cost than disorganized or primitive methods bring.

Opinions have been advanced that the mongrel class of sheep in the Inter-mountain States must be displaced before the Australian system can be operated successfully. Let those critics bear in mind that better sheep and better wool will quickly follow the establishment of the Australian system, but can hardly precede it. Since Mr. W. T. Ritch came to this country and explained the merits of the Australian system there has been more interest taken and a greater effort made among sheepmen, in general, to improve the quality of their wool than have ever been noted before.

PRESENT METHOD HANDICAPS

The method employed in buying wool in the West, either upon the sheep's back or at shearing time, certainly has not been conducive to improvement. The practice of offering approximately the same price for all clips in a given locality without regard to the varying qualities of the clips has in a measure obtained. In fact, in some sections the sheepmen have pooled their clips. But in regard to the different qualities of the fleeces in an individual clip there has never been any difference in price between the fleeces which carried the highest value and those which carried the lowest, the price being always a blanket one. It requires only the application of common business sense to reach the conclusion that under such a system progress or improvement in breeding is practically impossible. If we would stimulate or encourage the sheepman to produce better wool we must pay him proportionately.

DIFFERENCES IN TRADING

If the methods of western sheepmen appear to an eastern man antiquated and absurd, then we might suggest that the present method employed in transactions between dealer and manufacturer appear to the western man equally antiquated and unbusinesslike. The western buyer usually advocates loose packing in the bag, lest by more compact work the sack or bag should carry a higher weight, thereby giving the manufacturer an impression that the wool was of heavy shrinkage. Are we to believe that the manufacturer is such a novice? The loosely packed wool is taken from the bag and put through a process known as "grading." It would appear to the unprejudiced observer that in this operation of grading no two graders handle the wool alike; in fact, unlike the Australian classer, the American grader has no voice in the matter—he must grade the wool as directed by his employer. On the assumption that the manufacturer's "man" will reject a considerable percentage in any event, the grade is usually "crowded," particularly if the market is advancing, and more particularly if a certain line of wool was purchased before the operation of grading. When the purchasing manufacturer in his own good time sends his representative to receive the wool this agent handles every fleece over a table, testing the wool and investigating each fleece to ascertain if the sheepman has included lumps of tags or other foreign matter. This handler arbitrarily rejects any fleece which does not suit his fancy. There seems no way of softening his feelings or reducing the number of rejections except by furnishing him with cigars and keeping him "jollied." He is said to "throw the wool harder" upon a dark day than upon a bright one; so we can imagine that many fervent prayers are offered by the sellers for bright days. After the wool which passes examination is delivered, the dealer frequently has a lot of rejections on hand, and no matter what his motives have been he is entitled to some degree of sympathy. It would appear that our whole system—or lack of system—of handling the wool, from the time it is bought upon the sheep's back to the time it is actually paid for by the manufacturer, has developed more or less sharp practices all the way up the line. Foreigners tell us that when Australian wool is packed its quality is guaranteed and no purchaser can reject a part of any bale. If this is true, what a contract between that and American methods! What a waste there appears to be in handling wool so many times in the dark eastern warehouses, with the increased amount of room necessary, when all this could be done more economically and satisfactorily at the source—the shearing sheds!

THE BITTER CREEK PLANT

REASONS FOR PRESENT CLASSES

We have been told many times that far too many classes were made at the new sheds to suit the needs of the American manufacturer. In regard to certain manufacturers and buyers, we admit that the number of classes would not please them, and we can conceive of certain reasons for it. The average representative coming to the West ap-

(*Continued on page* 189)

Machinery Exhibitions of Advantage to Textile Industry

Basis of Success of Textile Exhibitors' Association

By Frederick H. Bishop, President

WHEN a theorem has passed beyond the sphere of argument and has by demonstration become an established fact, it will generally be found that those who most opposed it from the argumentative or speculative standpoint become its most earnest advocates.

This may explain why it is at this date a difficult matter to assign satisfactory space to applicants for the fifth exhibition of textile machinery and supplies, to be held in April, 1916, in Mechanics Building, Boston, whereas at the opening of the first exhibition the amount of space sold was less than 7 per cent. available for exhibition purposes.

The fundamental purpose was as sound then as now, but required proof through repeated demonstrations of its economic, financial and educational value. The few original members of the Textile Exhibitors' Association who, through the courage of their convictions, assumed the responsibility of the first exhibition in Mechanics Hall, have the satisfaction which comes from approval of their confidence and judgment, but would hardly claim credit for many of the beneficial results brought about through the hearty co-operation of later converts to the faith.

The best form of advertisement is that which impresses upon the mind of the prospective customer in the clearest manner, and therefore with the most permanent results, the merits of that which is offered for sale. For the great mass of standard articles sold on the basis of stated quality or price, and where a word of description is sufficient, the public press or trade paper is the best medium for reaching the ultimate consumer. This can also be extended to mechanical devices where an illustration of the exterior gives a general idea of the construction and operation to experts, but is practically wasted on those not skilled in the art. The traveling salesman is able to illustrate these in some instances by samples, these being supported by the eloquence of his verbal description. When we aproach the question of properly advertising new and sometimes intricate machines which produce new results, or illustrate a marked improvement over other machines for a like purpose, we find that a picture or verbal description, however explicit, does not convince and impress the mind of the hoped-for customer. He must see the "wheels go round," and take such a mental photograph of mechanical movements and their results as will enable him to print from it any time in the future when it may be necessary. This is the foundation upon which rests the great success of the Textile Exhibitors' Association. It groups en masse the latest and best developed machines and appliances for improved operation and economic results in textile manufacture, and without undue expense brings the mill expert in touch with these under the most favorable conditions for examination.

He comes to the exhibition with his mind in a receptive condition, prepared to examine and compare different types of machines designed for a like purpose, and to properly sum up the advantages of each for his particular class or grade of work. The eye grasps the significance of mechanical movements and conveys to the brain a more accurate conception than could be conveyed through a verbal description, even though presented in the best form. Furthermore, the eulogies of the salesman are subject to discount because of his enthusiasm, and the reasonable belief that he is presenting his facts based on models or special tests, rather than on every day mill practice and reasonable efficiency.

ORIGINAL AIM OF ASSOCIATION

The Textile Exhibitors' Association was originally formed for the development of an economical method of advertising. The outcome in this respect has been most satisfactory; the development of the plan, however, has demonstrated that the great value of these exhibits is to the textile industry as a whole, through the opportunity given superintendents, foremen, and operatives to secure the latest and best information on practical lines and under the most favorable conditions. This is understood and appreciated by mill managers throughout the country, and many are preparing to send superintendents and foremen of departments to study the exhibits in the interests of the mills. The Association does not rely on paid admissions, nor does it cater to the general public for the purpose of swelling receipts. It is, therefore, glad to welcome as its guests those directly interested in textiles.

OUTLOOK FOR NEXT EXHIBIT

Based upon past experience it is expected that the attendance of mill men will absorb fully the time of those in charge of the exhibits. This is practically assured, as the exhibition will cover all lines of textile manufacture and fill all available space in Mechanics Hall. Assurance is received of attendance from the most remote sections of this country and from many foreign textile centers, it being generally understood in foreign countries that the most recent inventions and improvements will be on exhibition.

Textile Week in Boston, April, 1916, should be set aside by mill men for a week of study and pleasure.

Results of Southern Textile Exhibit

By A. B. Carter, Secretary

A CAMPAIGN of "preparedness" for higher textile education was inaugurated more than a year ago, at the meeting of the Southern Textile Association, held in Birmingham, when it was decided to hold in the South, a Textile Exposition, under the auspices of this Association, for the definite purpose of broadening the knowledge of its members as to improved methods of manufacturing, and to show in a practical way the possibilities, development and advancement of all kinds of textile manufacturing.

The first Textile Exposition was launched at a meeting of the Board of Governors in Greenville, S. C., by David Clark of Charlotte, N. C., in the early part of 1913. At that time W. M. Sherard was appointed Chairman of the Committee to investigate the matter of bringing a textile show into the Southern territory. At the June meeting of 1913 others were appointed on this committee, together with Mr. Sherard, and they kept the matter alive before the Association until finally at a meeting of the local members of the Textile Association in Greenville, definitely decided to have a Textile Show, and the following men were elected to take charge of the Exposition:

Robt. F. Bowe, Chairman; A. B. Carter, Secretary; Edwin Howard, Treasurer; Milton G. Smith, Chairman, Educational and Welfare Department, and Assistant Treasurer; J. H. Spencer, Chairman, Machinery and Supply Department; G. G. Slaughter, Chairman, Mill Products Department; James H. Maxwell, Chairman, Hotels and Transportation; David Kohn, Chairman, Publicity; J. E. Sirrine, Chairman, Hall and Building Committee.

ADVANTAGE OF CONCENTRATION

The benefits derived from a textile show in the South are many. The textile industry in the South is spread over such an enormous territory, that men interested in the industries in the different sections of the South, seldom meet one another. Even the representatives of such concerns as sell the mills are unable to cover this territory in anything like a complete manner. For this reason, any large Textile Association meeting or Textile Show that will draw men from all parts of the territory to meet together socially and in convention, is a good thing for the men and industry. There are no machine shops in the South; practically all of the machinery and supplies are made and shipped from New England, and our mill men in the South do not have the advantage of seeing the latest type and models of different designs of machinery, as the people in New England do. Mill men in New England can easily reach almost any shop and return to their mill in a day. For this reason the southern mill men do not enjoy this benefit.

The Greenville Exposition was a very valuable asset to many machinery and supply houses. For instance, one man told me that the Greenville Exposition put his concern on the map. An exposition is a medium for advertising; exhibiting is practical advertising. You may read about anything for years, but you can learn more in ten minutes by witnessing a thing than you can ever learn by reading about it.

The Executive Committee mentioned in this article devoted their entire time in getting up the Southern Textile Exposition absolutely gratis; not one of them received a cent of compensation in any way, shape or form. The generalship they displayed in the execution of well laid plans, excited the admiration of exhibitors and visitors alike, and is responsible for the marked success which characterized the first Southern Textile Exposition.

The cause of co-operation, one of the mottoes of the Southern Textile Association, was never quite so materially advanced as it was throughout the planning and carrying out of the work incidental to this Exposition. From it the varied manufacturing and commercial interests of Greenville and vicinity received an inspiration out of which there is being felt an upspringing of good results. The idea of a brotherhood of reciprocity of interests in each transaction between exhibitor and committeeman formed a relation which worked for mutual good. Due to the smooth and efficient handling of a network of complicated and complex details, they have paved the way for future expositions of larger volume, and in this fact is found an item to the credit of the first Southern Textile Exposition which is most to be taken into consideration when the reports of past successes are recounted.

ADVANTAGES TO MILL MEN

One of the most significant and satisfactory results of the Exposition is its stimulating effect upon practical mill men, and the advantages they derived in being able to see in actual operation modern, high-class improvements and appliances, which are being brought out by enterprising machinery builders, which show the result of evolution based on mechanical principles, and are the outcome of long years of study and practical experimentation, making plain the high degree of efficiency designers of textile machinery and appliances have attaned.

The display of fine manufactured goods by a number of the large Southern cotton mills was most interesting, and more than anything else, it has forced upon our northern neighbors who are manufacturers, recognition of the fact that we are rapidly increasing the number of spindles and looms on fine goods in the South, to a degree commanding the admiration of our friends. With such increases here, more of our cotton crop must needs be used by us. The raw material of the world is most surely in the hands of the South, and we are gradually and more firmly becoming a strong competitor in the sale of manufactured cotton. If each division of industry will but do its share, there will be no doubt about success in our gaining a position in the world's markets commensurate with our skill and ability.

In conclusion, the Southern Textile Exposition, although the first effort, was conceded as quite successful from every standpoint, is yet in its infancy. We have only touched the fringe of its possibilities in directing the attention of practical mill men to the present construction and operation of textile machinery and the wonderful strides that are being made in this direction. Such efforts will serve to increase their efficiency in their particular activity.

Benefits from Hosiery Association Exhibit

By C. B. Carter, Secretary-Treasurer

STATE, national and international expositions during the past thirty years have unquestionably demonstrated their usefulness, the recent one at San Francisco being unusually successful, considering its location and the unfavorable conditions resulting from the European war.

Various trades have also very successfully inaugurated exhibition features in connection with their annual conventions, but the National Association of Hosiery and Underwear Manufacturers had the honor to introduce the exhibition features in the textile trade, beginning in May, 1906, and holding an exhibit every year since that

(*Continued on page* 203)

Cotton Goods Trade Makes Good Gains

Readjustment Necessary in Exports

Increases in Some Quarters Make Up Decreases in Others

READJUSTMENT to the unusual, and in many cases abnormal, affairs induced by the war, has been the moulding influence throughout the year in this country's foreign trade in cotton goods. Though much of export business improvement can be traced to the war, on the other hand many declines in oversea trade can be traced to the same cause. One offset against the other in the early part of the year gave no encouraging result, but as the year closed the miscellaneous trade was showing steady progress toward larger totals. The popular expectation has been for great and rapid strides toward the upbuilding of an immense foreign trade in textiles, and those with this outlook have been disappointed, but exporters and other men in close touch with foreign markets long ago forecasted that development would be slow and much along the lines that it is now actually following. When the non-availability of so large a proportion of Europe's textile production is considered it is remarkable that there is not a greater famine of merchandise in the world's consuming markets than is actually in evidence. The sluggishness of the American industry in adapting itself to new demands is said to be responsible for the comparative slowness with which new foreign customers are secured. Under the present situation these new customers are not so much seeking American goods as they are seeking a substitute for German, English or whatever the nationality of the goods no longer obtainable. The American manufacturer is not willing, and in many cases not able to turn out new constructions or new finishes to duplicate the goods to which the foreign merchant is accustomed. Instead something similar is offered, and the foreigner either goes elsewhere for his supplies or buys only the smallest lot possible to carry him until what he actually wants is again available.

WAR ALSO HAS ADVERSE INFLUENCE

In cutting off the supply of old-established lines of goods the European conflict has opened numerous markets to American merchandise, which under normal conditions would never have been possible. At the same time, however, the war has been the producer of many difficulties, such as have made the year one to be remembered by exporters as tangled with a mass of unusual handicaps. These difficulties chiefly concern the machinery for handling export business, and include the slowness and uncertainty of communication, the wide fluctuation of exchange rates, war risk insurance, high freight rates, and the scarcity of vessels for shipping goods. When code cables were refused and full English wording required, a large item was added to the expense of doing business. Trans-Atlantic mail service became open to delays, because few ships sailed, and those slow ones. Sterling exchange has been below par most of the year, due to the fact that America's exports to England far exceeded imports and a bottom figure for demand sterling of 4.76 was touched in August. Gold shipments had no sudden effect upon the rate, but a gradual rise brought it to 4.70 in December. At the low point exporters said that exchange hindered their business, as the English pound had only about 93 per cent. of its normal buying power. One American concern, which had been selling goods on a shillings-and-pence basis in England, actually lost money at this time. Ocean freight rates are in many cases over 100 per cent. increased from normal, and insurance rates have been high. Whereas it used to cost about ⅛c. per yard to land goods in the most distant ports of the Far East, it now costs ⅜c., according to a shippers' figures.

MARKET FLUCTUATIONS NOT HELPFUL

Although the cotton goods market during the year's first eight months had bargains to offer such as had not been seen for a long time, the mere fact that prices were low did little toward stimulating trade. Where it did excite better buying, reaction followed and a heavy stock of low priced goods has been a depressing factor in more markets than one. During the first half of the year business sentiment throughout the world was cautious and more bearish on the future than otherwise. Rarely did a merchant cover ahead on anything but assured needs. When raw cotton's rise and vast improvement in home trade caused sharp advances in the goods market in the year's last quarter, foreign merchants in many cases realizing that the market had gotten away from them, sat back and let it go, paying the higher prices only when the merchandise was actually needed. On the other hand such a market as Manila bought heavily at the low prices of last spring and had goods foisted upon it by speculators. The market became overstocked and competition among dealers cut profits to a minimum. They were therefore unable to buy on the advance and their operations during the last five months have continually been reported as scarcely noteworthy. Export buyers are to some extent pushed to one side when the home trade begins its activity, and better conditions at home than existed in many oversea ports raised merchandise values to a level that foreigners were slow to pay. The fact that Japan is a cheap and readily available source of supply is playing an important part in determining the Far Eastern trade. China is coming more and more to depend upon Japan for the class of goods which were formerly purchased here and Japan is meeting with success not only there, but also in India and Australia.

GREAT YEAR FOR DUCK AND YARN

Duck is probably the best of the various classes of cotton manufactures exported from the United States in 1916. Last available figures are those of the export of duck from the port of New York from Jan. 1 to Oct. 9, which show a total of 96,267 packages, valued at $4,031,470. When this is compared with figures for the similar period in 1914, 15,624 packages, valued at $995,942, and in 1913, 16,866 packages, valued at $1,052,308, the unusual nature of the increase is realized. If the same rate of shipment is continued through the year's last quarter total duck shipments for 1915 from New York alone will be over $5,650,000. The ports to which most of this duck was shipped are London, Glasgow, Havre and Bordeaux, a clear

(*Continued on page 67*)

Cotton Wins Upward Struggle

Stagnation of First Half Year Gives Way to Improvement

AN advance in prices of convertibles, averaging 15 to 35 per cent., and a vast improvement in the spirit of business that cannot be estimated numerically, have both taken place between the first and the last day of 1915. The year opened with low cotton and a comparatively narrow demand for merchandise; it has closed with cotton again at normal figures and a breadth of demand such as has not been seen since the fall of 1913. In January raw cotton gained about 100 points, and the cotton goods market responded, but only to the extent of nearby covering on the part of those who were short of goods, and as soon as buying slackened prices fell back. This succession of events was true of many flurries in the market through the year up to September, and there were long periods of low prices that brought forth fruitless complaints from mills and no active interest from buyers. Up to the close of August the future looked decidedly bearish; another cotton crop was growing, the war continued, the Lusitania and Arabic had been sunk with the resulting tension to this country's foreign relations, export trade in cotton goods was not improving as expected, and its gains had hardly made up for its losses. Few buyers under these circumstances were willing to take the long side of the market. In July many freely predicted 5 or 6c. cotton for the fall, and buying therefore of such merchandise as reacts quickly to fluctuation in raw cotton was of small compass, operators moving along from day to day until the lower basis which they were expecting should arrive. In addition to this state of affairs there was an actually reduced consumption of gray goods in many quarters, which of course, was another strong factor in depressing prices.

ADVANCE SURPRISING BUT LASTING

All through the summer there had been talk of increasing prosperity in all industries but the textile, and dry goods merchants who saw war munitions plants booming and an overwhelming trade balance growing in the United States' favor, gazed on these things impersonally, believing that their area of influence could not expand beyond the industries directly concerned. And then came the advance of raw cotton in September and October, an advance which was not generally acknowledged to be of any permanence until it had established itself firmly at higher levels. Cotton at 12c. succeeded in doing what cotton at 7c. had failed to do: it injected activity and optimism into trade such as had not been seen since the beginning of the European war. Its effects was particularly potent because a rising market was quite the reverse of what had been anticipated. Manufacturers and jobbers were holding stocks that amounted to almost nothing; they were short of the market, if anything, having disposed of more merchandise than they had secured. They hastened to cover, and later as the advance continued, to buy ahead. In the South first signs of higher cotton had remarkable effects. It made holders very stiff and the spot situation tightened up at the very time in the cotton season when manufacurers had figured that large receipts and ginnings would induce weakness. The South is a large consumer of cotton goods as well as a grower of the raw staple, and the return of prosperity gained by cotton's advance brought the southern trade again strongly into the market for goods, and this additional demand joined itself to the many factors working for a continuance of the advance. In a period of two months or less buyers effected a complete change of front and the market a complete change of spirit.

DYESTUFFS AND OTHER TROUBLES

The cotton manufacturer has had an uphill road through the year not only because of the average buyer's indifference through the first eight months, but because of troubles with dyestuffs and the difficulties of economical operation. The leading problem which restricted profits in many quarters when business was dull and hampered production when trade turned for the better, concerns the dyestuff supply. This has been the subject of continual discussion during the year, and its solution seems to rest on gradual development rather than on the sudden working out of some clever idea. The situation goes back to America's dependence on Germany for coal tar dyestuffs, importations of which have been a negligible factor lately. Lack of indigo hit a number of denim mills severely, until a logwood substitute was developed, and just as this was achieving general acceptance throughout the trade, England declared a logwood embargo, the price advanced almost 100 per cent., and denim manufacturers had to set about solving their problems all over again. Full assortments of all gingham patterns have not been available because certain reds, blues and blacks are scarce. Prints suffer from the same situation, and before buyers are granted certain colors they must order a specified proportion of other styles. There are also different prices on different colors, and designers have turned their attention to attractive patterns on white grounds, which consume little coloring matter. This is true also in ginghams, for patterns with a good deal of white in them have been shown this year. Piece-dyed goods have also suffered through lack of fast colors, difficulty in matching shades popular before the war, and the high levels to which finishers have raised their prices.

PRINT CLOTHS HOLD IMPROVEMENT

The print cloth market was a generally unsatisfactory affair during the first part of the year. Sellers said that the lack of dyestuffs for finishing these cloths was leading converters and printers to withhold their usual purchases, and was actually decreasing consumption to a point that almost seemed dangerous for the market. Prices followed a saw-tooth fluctuation from January through August as inactive periods with declining prices would be followed by little spurts of activity. As a general rule the trend of raw cotton was fairly closely reflected in cloths during this period, as it was usually a little upward movement in the raw material that induced buyers to cover ahead. Almost nothing on a big scale was met until the close of September, when rising cotton began to bring out broader demand. October proved one of the most active months experienced for a long time, and

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there was an upward sweep of prices that placed goods at about the high point of the year. The market was well supported, even after the higher prices became general, because a number of buyers had withheld at the first part of the rise, believing it to be only a flurry, and they came in later, adding to the general return of confidence by operating three and four months ahead. There was an unusually small amount of speculative buying in the early part of last fall's rising market, because the big operators did not fully credit the market's strength, and as a result the only second-hand selling that has come to light has involved small surpluses here and there of odd lots, the sale of which barely affected the market. Wide goods are the leading construction in the print cloth trade at the present time, but narrow goods for the last six months have been unusually stiff. Sellers state that manufacturers have shown headlong haste during the last two or three years to scrap their narrow looms, and they have in fact curtailed the supply of narrow goods more rapidly than the rate at which demand has been shrinking. A firm position on such descriptions results, which, however, sellers state must not be mistaken by manufacturers as denoting any returning vogue of narrow goods.

BEST FINE GOODS YEAR

Beginning last spring orders for fine and fancy gray goods began to pour into New Bedford mills at a rate which suggested broader distribution of these goods than had been seen for a number of years. Late year developments have borne out this indication, mills are now running at full capacity, and forward orders are of sufficient volume to keep them busy for four to six months ahead. Certain brokers believe it to be the best fine goods season in a decade. Back of the improved trade seem several causes, the use of greater yardage in women's apparel, the fact that imports of certain fabrics declined, and the scarcity of certain otlier lines of colored goods. Fine goods with a slightly fancy touch lend themselves to bleaching quite as well as to dyeing or printing, and in the present period of high-priced dyestuffs this virtue recommends them. As a general thing plain weaves, even for bleaching, lead in the fine goods demand. The voile construction has been perhaps the most popular, and it has also been a good seller when decorated with roving stripes or cords, or as a "seed voile." Organdies and marquisettes have been important fabrics, the former frequently printed, the latter sometimes embroidered, and both popular as plain white goods. Crepes have received a setback and are not as popular as a year ago. In heavier goods piques, poplins, Bedford cords and corduroy effects are leaders. Fine and fancy grays were strong in July and prices began to advance sharply from that time on. As long staple cotton is particularly scarce the premiums are high and the desirable grades hard to get. During December converters tried to reorder on fine goods only to find that April was the nearest delivery some mills could offer and radically higher prices are being asked in some quarters.

SHEETINGS HAVE LONG WAIT

Coarse yarn sheetings as a class had the longest wait of any branch of the gray goods market, for the improvement which marks the end of the year as so radically different from the beginning. It was not until early December that commission men were able to state that business in sheetings had at last emerged from sluggishness and that forward orders were larger than at any time for over a year. Sheetings have lacked the support of the eastern export markets and their absence has been more marked than ever before in recent years. Nothing in the home trade arose to take their place, for domestic distribution was, if anything subnormal. From January to November trade in sheetings was spotty. It moved up and down with variations in demand and in cotton, but there appeared no general or established demand that could pull prices up from levels which many mills said represented nothing more than closely figured costs of manufacture. At various times during the year there were sharp advances in burlap and these brought out fair buying of sheetings and osnaburgs by the bag trade, but not until the last few weeks of the year did the activity of this branch of the trade take on a settled appearance through the placing of contracts covering four to six months ahead. In September when print cloths began to score their advance sheetings went up largely in sympathy and demand was so weak that it was cut off almost altogether. Cotton went still higher and sheetings remained about unchanged, and then buying recommenced. Sellers, however, at this time stated that they could have made more profit by selling in September at a lower price than by waiting until October and not securing an advance commensurate with the increase in cotton. At the close of November, however, things had changed and sheetings of all weights were being taken up quickly at spot and placed under order for months ahead at good prices.

YARN DYED GOODS SPOTTY

The gingham is still another class of merchandise which recorded marked improvement during 1915. For last spring ginghams were only fair, prices were well maintained despite low cotton, but distribution was not encouraged. The change begins with the opening for spring, 1916, which was made in September instead of July as the year before. At this opening unchanged prices were expected, and the first lines in the field were so quoted. The rest of the market on fancy ginghams, however, came out at reductions of ½ to ¾c., due to sharp competition and a desire to achieve broader distribution. Commission men have since reported good orders received and advances have been made that bring the lines up to, and in instances above, former prices. Southern staple ginghams have been hampered by dye scarcity, but they have been in sufficient demand to sustain several good advances. Eastern staple ginghams as the year closes are held at value in one quarter and the new price is expected to be higher. Flannelettes, domets and other napped goods lines have closed the current season well and the prospects are for a successful opening at an advance next year. The opening last January brought only an indifferent initial trade, but demand improved through the year. The informal opening of 1916 lines for manufacturers made in October was reported successful. Certain mills have taken looms off napped goods manufacture to turn out ginghams and shirtings, and as the year closes, commission men say that the normal production of napped goods is not available. Denims have passed through a mixed season. The first few months of the year were given over to experiment with logwood colors. Numerous new lines were on the market by spring and by fall they had taken a strong hold on the trade and buying was again broadening after a cautious period. Then came England's logwood embargo, that dyestuff rose from 30c. to 65c. per pound and several of the market's most important denims were withdrawn. Logwood denims had been selling at about 15¼c. for the 9oz., and real indigo denims were held at fancy prices, anywhere from 19 to 29c. Tickings, hickories, etc., passed a fair year, except where tangled in the dyestuff question.

PRINTS AND BLEACHED GOODS

Staple prints have passed a not altogether satisfactory year. The dye scarcity has made it necessary to name different prices on certain colors and on light and dark shades, and at various times some descriptions have been advanced without involving the others. The scarcity of the cheaper ginghams has been helping prints to some extent, particularly in plaid or check designs. Percales can be reported as in better condition all through 1915. Commission men state that the cutters-up are buying percales in large quantities and that the ready-made dresses that they offer are taking well with the consumer, and as a result a smaller yardage of prints is being sold over the counter for making up in the home. Exports of prints have been a disappointment, but there is still hope in the future. The year has been an unusually good one on bleached goods. There have been several periods of fairly heavy buying and since the late summer prices have been moving steadily upward. In the first half of the year, in periods of great weakness in gray goods, bleached goods suffered setbacks, but the year as a whole has been successful. The manufacturing trades showed greater proportionate improvement than did the jobbing, for in many made-up garments style ordered the use of much increased yardage. The well-known brands are in many cases reported sold several months ahead, though in other quarters operations are said to be excellent, but not characterized by much long future contract buying. Finishing prices on bleaching have gone up during the year, though not to the extent of those on color work. Bleachers anticipate a busy season, inasmuch as many fabrics heretofore dyed or printed are now being bleached. White goods are achieving a place in the export field that could still be improved if the finish would more closely imitate the English.

DUCK THE BEST FABRIC

Commission men when asked what one fabric has experienced the most thoroughly successful season almost invariably answer, "Duck." At bottom this branch of the industry owes its present enviable condition almost wholly to export demand, and that in turn is directly traceable to the European war. Now that weekly export figures are no longer available it is difficult to be accurate, but authorities estimate that 2,000 to 3,000 rolls of duck have gone out weekly for the last few months to Europe alone. There is also demand from South America, Australia, etc., for duck formerly secured from Europe, and this branch of distribution is on the increase. The home trade has also been stirred up and buying during the last three months has been better than for some time. Present quotations place narrow duck 20 to 25 per cent. off list, and wide duck about 30 per cent. off. Narrow duck and army duck have been the two best sellers abroad. Mills are now sold several months ahead on various lines and more business is in prospect that they can handle. All this is a sharp reversal of conditions in 1914, when demand was weak and supply overpowering.

EXPORT REVIEW

(*Continued from page* 63)

demonstration that a large percentage of this business is on military supply orders. The narrow widths, in particular, have been sought until these are well sold ahead and held on a higher basis than wide duck. Australia, New Zealand and South America also helped in the large total of duck business. Cotton yarns form an item which is worthy of a place beside duck as subject to an unusual increase this year. For the six-month period, May to October, almost $1,000,000 worth of yarn was shipped to South America alone, compared with the full year of 1914, which totaled only $51,000, of 1913 with $160,000, of 1912 with $179,000, and of 1911 with $177,000.

Argentina is the biggest factor in this trade, and yarn exports to that country from New York per month now average more than the full annual average of the last six years. Argentina's figures for September were $292,000, and for October, $215,000. The yarn being taken is chiefly 10s to 20s in singles and ply. It is used in Argentina for weaving into duck and other cloths. Buying was active during the summer, but slowed up on the advance early in the fall. At the beginning of December it began to revive at the higher level and lots of several hundred thousand pounds each were sold.

FLAT PERIOD FOR FAR EAST

The Far East as a whole has been a poor customer during the year except for the Red Sea, which placed an excellent business early in the year. The great shrinkage in China's operations resulted in unusually light support to the sheeting market from a quarter that has been known to buy from 10,000 to 30,000 bales at one time. China's lack of life results from a combination of many factors, chief of which are heavy stocks of low priced goods in distributing centers; Japan's successful competition on sheetings and drills, similar to those made here; China's governmental instability and the lack of confidence that inspired; the tangle of provincial currencies and silver exchange, and the generally slow buying on the part of the natives. When stocks are depleted and values rise to somewhat near this market, it can then be said whether or not American goods are a thing of the past in China. Many merchants now despair of recovering this market, but 1917 will be the period of real test. The tottering republic finally came to an end near the middle of December, when the president, Yuan Shih-Kai, was appointed emperor. If the change results in a stronger government and is accepted peaceably, it will have little, but a good effect on business. The Red Sea was a good buyer during the first half of the year, but fell flat after that. The war had checked the exploitation of cheap Austrian and Italian goods at Aden and American goods profited accordingly. Adequate supplies of low priced goods and a sharp advance in the home market, however, checked all buying after August. India has brought drills in irregular fashion through the year, showing no desire to buy ahead when low prices were possible. Apparently little more is being done than maintain the Pepperell brand in that market, and fresh buying rarely develops until the last contract has been shipped out. Since August India bought a few thousand bales at 6¼c., a few more at 7½c., but none at 7½c., which was the asked price in December.

MISCELLANEOUS TRADE BROADENS

The trend of affairs in South America, West Indies and the islands of the Pacific has been steadily toward improvement, though trade has come forward in scattered and irregular fashion. Of South America Colombia is reported the best center for cotton cloth. Argentina is improving along this line, but at the same time taking yarn and hosiery in good volume. Chili faced financial depression early in the year from which it is just emerging. Brazil

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is not yet a strong customer, but there are hopes that demand for American goods will broaden. Direct banking connections in several large South American cities are helping the American exporter with credit information and data on needs of the market and on methods of transacting business. All sorts of efforts are being made to push business in South America and exporters see that some of them are bearing fruit now. Were it not for the American manufacturers' indifferent attitude, especially in a period such as the present with its good home trade, better results could already have been achieved in this quarter. The West Indies have been fair customers, especially Cuba. That island is becoming more and more Americanized, and thorough saturation with American business men and tourists is helping increase the call for American goods. Hayti has gone through several revolutions during the year, but has maintained buying on the usual scale. Australia and New Zealand have been good buyers at intervals. The former took good quantities of duck and denims. Logwood dyed denims were just securing a hold on these markets when the logwood embargo sent dyeing costs up and made the future uncertain, just as the failure of indigo imports did a year ago, and certain denims have again been withdrawn from further sale. The island of Madagascar has again been a buyer this year after an absence from American cotton goods circles of about 20 years. When a French protectorate this center was a good buyer of American goods, but the recent preferential tariff eliminated it. Gray goods have been bought for Madagascar, but only in small lots.

CENSUS FIGURES SHOW TREND

According to the government figures for the exportation of cotton cloth for the nine months ended September, 1915 records a good increase over the similar period of 1914. For 1915 387,712,808 yards, valued at $28,245,708, were shipped out; for 1914, 249,101,726 yards, valued at $17,589,083, and for 1913, 349,402,003 yards, valued at $24,059,214. Compared with 1914 Mexico, Hayti, Chili and China show decreased takings, China's shipments showing the greatest proportionate decline (about 50 per cent), totaling for 1915, 17,513,513 yards, valued at $1,154,858. The Red Sea takings jumped from 5,752,402 yards in 1914 to 33,532,109 yards in 1915. The United Kingdom took 15,804,012 yards, against 2,033,761; Canada, 22,122,968 yards, against 17,257,155; Cuba, 37,883,261 yards, against 17,387,150; Colombia, 15,868,829 yards, against 8,398,740; British India, 15,998,305 yards, against 9,199,416; Philippines, 95,345,757 yards, against 58,018,016. Knit goods exports increased from a total value of $1,927,619 in 1914 $12,181,384 in 1915. Cotton yarns touched $2,436,355, against $569,130 in 1914. As the year closed there is reported to be little or nothing on the books for future shipment to China, India or Red Sea, and 1916 shipments to those centers depend almost wholly on orders placed during that year. The status of trade with the East is more clearly indicated by business placed during 1915 than by shipments made in that period. From one in close touch with market affairs the following estimate of the number of bales placed under order by the three important centers of the Far East has been obtained. Comparison with past years shows the downward trend with China, the sharp improvement in the Red Sea and static condition of India:

	1915 Bales.	1914 Bales.	1913 Bales.	1912 Bales.	1911 Bales.
China ...	4,000	20,000	110,000	75,000	125,000
Red Sea	60,000	30,000	25,000	35,000	45,000
India ...	15,000	16,000	12,000	27,000	16,500

Prosperous Fine Goods Year

New Bedford Mills Find Work for all equipment

DUE to a combination of abnormal circumstances the year which has just drawn to a close has been more prosperous for New Bedford and its fine goods industry than any similar period since 1911, and manufacturers are looking forward with confidence and optimism to a continuation of as good business in the year to come. So long as the abnormal circumstances resulting from the European war continue, manufacturers are sure of a manufacturing margin wide enough to make a good return to them, and there are many who believe that, when this conflict ends, there will be better business ahead than there was in 1914 before the great struggle really began to exert any influence here. The Democratic tariff, which lowered rates tremendously on fine goods and had apparently left the industry wide open to well nigh ruinous competition from the low-wage countries of Europe, has not had an opportunity to show for an extended period how serious it could have been. Exports to this country, so far as the fine goods industry was concerned, fell off tremendously, and the demand of the United States was left to be cared for almost entirely by its own mills, while in addition to this, some manufacturers in New Bedford have really taken a little export business.

The fear of the tariff still hovers over New Bedford, and its shadow casts gloom over the future when manufacturers look very far ahead. But it is a fact that during 1915 it has not worked injury to the industry here because it was rendered imperative by the war. There is a demand for goods which augurs well for a year's prosperity and manufacturers have openly stated during the past few weeks that they have had to refuse lucrative offers for contracts calling for delivery prior to April, for the simple reason that all their looms are filled until that date. Here and there might be found some individual manufacturer who had a small section of looms running out between now and February. All of these small sections have been placed on excellent business, and the only regret in this city among the manufacturers has been that a considerable volume of what they term "late business," coming into the market behind the regular season, could not be handled.

During the year, mills have gradually taken on business until during the past six months or so, there was not a mill on fine goods in New Bedford which was not running to capacity; there are more fine goods mills paying dividends at their regular rates than for two years or more past; two mills have declared extra dividends, the Grinnell of 50 per cent. and the Potomska of 20 per cent.; one mill has largely increased its capitalization; payments on accrued dividends in some instances have been made; the only new construction of any moment in the past four years has been undertaken or will be undertaken immediately (being at the present time authorized); and there have been no labor troubles of any moment, and apparently none immediately forecasted. Every mill in the city is at capacity; some which are not perhaps properly balanced for big business are running some departments noontimes or evenings, and the close of the year 1915 finds the fine goods industry, so far as New Bedford is concerned, in an encouraging situation.

And in addition to the European war's effect upon the demand for goods manufactured in this country, the war has also served to focus attention more sharply upon fine white goods such as New Bedford produces, inasmuch as there has been a shortage of foreign dyes, and manufacturers here believe that people throughout the country are substituting white goods in many instances where formerly they have used ginghams and other fabrics. New Bedford manufacturers sell practically the entire production in the gray, and the difficulties of finishing fall to the converter and not to the manufacturer. From converters, the manufacturers have learned of the difficulty of getting satisfactory dyes and of the sharp rise of finishing costs. New Bedford manufacturers have not been slow in forcing wherever possible, white goods into the channels where formerly printed goods were used.

Aside from the war, which proved such a business blessing in disguise, analysts of the year's prosperity find that the sudden change in women's fashions from the coarse, heavy narrow fabrics to the lighter cloths with the widening of the skirts, has played a highly important part. When the narrow skirts, and few if any petticoats style came into vogue, manufacturers in New Bedford saw profits begin to shrink with each narrowing of the skirts, and the skirts also changed in fabric to heavier coarser materials containing low counts of yarns which the New Bedford mills were not equipped to make. The manufacturers could not change the styles, although the matter became so serious at one time that there was talk of some sort of a campaign. But suddenly fashions switched again this year, the wider skirt came back into vogue and the mills were in a position to handle the business. There had been no new mills built in practically four years and accordingly such increase over the business of four years ago as the normal expanse of the country produced, found just about enough looms to accommodate it comfortably. Four years ago, manufacturers here believed that the textile industry had been expanded faster than the demand had grown. To-day it is the belief of manufacturers that it has about equalized itself again.

Upon the purely commercial side of the business, the manufacturers have found the year not an unpleasant one, and are going into 1916 with a feeling of confidence.

Not only has the period been a satisfactory one commercially, but also brought into being an entirely new commercial possibility for New Bedford in the matter of the "open competition" idea. The Manufacturers Association has discussed this; has received reports of converters upon it, and even of experts from other lines of business, and while it has not been adopted here, it is still being worked upon and its adoption could not be classed with the impossibilities of the coming year.

Manufacturing has not presented any very new or very serious problems, the mill managers report. Two or three years ago, when the lower count yarns became necessary, there was a purchase of a vast amount of new machinery, a throwing-out of mules and the introduction of frame spinning, and the readjustment of preparatory machinery which the lower counts of yarn made imperative. This shift-over had all been accomplished before 1915, and its difficulties have not been encountered during the past year. Styles have called perhaps for a little higher count than in the three years immediately preceding, but nothing but what the mills as at present constituted can handle.

And the matter of supply of extra high staple cotton that was a subject of serious moment in 1914, has not seriously hindered the manufacturing. The supply this year was better than in 1914, and the supply has come nearer to equalizing the demand since the new crop came into the market during the past three months.

Most of the new construction work has been undertaken during the latter part of the year. The Kilburn has about completed work upon the No. 1 mill, and it is nearly ready for occupancy. The Dartmouth group has placed one addition to one of the mills, making a substantial improvement in the property; the Hathaway is expending a considerable sum in permanent plant improvements, having added saw-tooth roofs to Mills No. 1 and 2, and being about to add a fourth story to No. 3, and the Sharp, with its increased capitalization, will build an addition that will be practically a duplication of its present plant.

At the Kilburn an addition 30 by 40 feet, has been built onto the boiler house; a three-story storehouse, 75 by 102 feet, has been erected, and No. 1 mill has been extended by an addition 138 by 157 feet, three stories in height.

At the Dartmouth an addition measuring 420 by 30 feet has been added to one of the spinning mills, and at the end of it is a large stair and clock tower, 22 feet square. This new construction, which does not take in the projected expansion of the Sharp and the Manomet, required a total expenditure for construction alone, in the neighborhood of a quarter of a million dollars or so.

Southern Cotton Mill Progress

Activities of 1915 in Adding to Spinning and Weaving Facilities

DURING the last quarter of 1915 unusual activity in the installation of spindles and looms prevailed in the cotton manufacturing industry of the cotton-growing section, this activity being of such an extent in the three months of October, November and December that the year's totals exceed those of 1914 by more than 100 per cent. This result was effected while the first three-quarters of the year's reports had only approximated those for the corresponding three months periods of 1914, the investments for that year having been about $2,500,000 less than the $8,000,000 credited to 1913. In this connection, it may be recalled that the record of 1914 was less than that of any previous twelve months for some years.

Doubtless timidity in the presence of the unusual and unforseen conditions produced, both directly and indirectly, by the great European war, was responsible for much of the decreased activity of the first year of the war. But as the tremendous export trade of the United States steadily increased each month, it was evident that cotton manufacturers, in common with manufacturers of many other products, were realizing that the demand for their goods must necessarily increase because of the great betterment in general business conditions and the enormous wealth being accumulated in this country. In many instances direct orders from the

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warring countries demanded certain cotton manufactures consumed for war purposes in one way or another, such articles as cotton duck, khaki cloth, bandages, aseptic wadding, etc., being well known as necessary to supply the different belligerents, mainly the allied nations opposing Germany and its associates. The constant destruction in large quantitities of such goods cannot fail to ensure continued large demands for several years, even though the war should end abruptly at any moment. When considering this source of demand it is well to recall that great amounts of cotton are consumed both here and abroad in the manufacture of explosives and similar materials, used by the armies in their destructive work. There is also a demand for cotton goods because of decreased importations of colored fabrics from abroad. All these varied conditions, in combination with the regular growing trade, surely result in a largely increased consumption of the varied products of the mills located in states wherein the cotton is grown.

INCREASING SPINDLEAGE AND LOOMAGE

The first quarter of this year was credited with 70,900 spindles and 620 looms, the investment for which may be conservatively estimated at $1,770,000. These figures were divided as follows: 25,000 spindles, an estimated investment of $625,000 for one new company, and 45,900 spindles with 620 looms, an estimated investment of $1,145,000, for additions decided upon by four established enterprises. During April, May and June the reports were for 101,000 spindles and 2,550 looms, a $2,525,000 investment, this expenditure being wholly for adding to the cotton mill facilities of ten existing enterprises. The state of Georgia was credited with 69,000 spindles and 950 looms, a $1,725,000 investment, for five companies, while North Carolina is credited with 17,000 spindles and 1,600 looms, a $425,000 investment, in the totals for the second quarter. July, August and September reports totaled 80,000 spindles and 672 looms, a $2,000,000 investment, for 16 companies and the figures were divided as follows: 13 existing enterprises to add 51,000 spindles and 672 looms, calling for an investment of $1,275,000; three new mills to have 29,000 spindles, an investment of $725,000. North Carolina leads this quarter, with 57,000 spindles, a $1,425,000 investment, for five enlarging and three new companies. During October, November and December there were reported about 200,000 spindles and 2,000 looms, requiring an approximate investment of $5,000,000. These totals are divided as follows: Seventeen companies adding 164,000 spindles and 2,000 looms, a $4,100,000 investment; two new companies installing 36,000 spindles, a $900,000 investment.

The whole year of 1915, therefore, presents the following figures; 451,900 spindles and 5,842 looms, the estimated expenditure for this machinery with accompanying and other requirements being $11,895,000. These totals were divided as follows: 90,000 spindles for three new companies, estimated as investing $2,350,000; 361,900 spindles and 5,842 looms for additions by forty-four established companies, estimated as investing $9,545,000.

IMPROVEMENT IN QUALITY GOODS

Southern manufacturers are continuing their efforts toward the production of higher grades of cotton cloth, this being a regular feature of plans for new mills and for enlarging established factories. Another feature that continues to be prominent is that those manufacturers who have been successful in operating mills for many years are the men who are investing the largest amounts for new buildings and machinery, mostly for enlargements of existing mills, but in some instances for building separate plants. This is evidenced in the foregoing figures showing that $9,544,000 will be the cost of 361,900 spindles and 5,842 looms for additions by 44 companies, while $2,350,000 is the cost of 90,000 spindles and 30 looms for four new companies.

COTTON CONSUMED BY SOUTHERN MILLS

The quantity of cotton consumed by the southern mills is another feature of the southern cotton mill industry worth considering in connection with the mill progress of the cotton growing section. About twelve years ago the southern mills advanced to that point where they required 2,000,000 bales of cotton annually, while other sections (mainly New England) were taking 1,967,000 bales. In 1906 the southern mills required 25,000 bales in excess of other American mills. Later this increased as follows: 2,193,000 bales for southern and 1,896,000 for other American mills, in 1908; southern mills required 2,341,000 bales for southern and 1,993,000 bales for other American mills, in 1910; 2,363,000 bales for southern and 1,993,000 bales for other sections, in 1911; 2,744,000 bales for southern and 2,631,000 bales for other American mills, in 1912; 3,037,300 bales for southern and 2,513,600 bales for other American cotton manufacturers, in 1913. For the cotton season ending Dec. 17 (accounting for 139 days), there were 6,670,460 bales of cotton in sight, a 735,975 bale increase over last year, the exports being 2,103,697 bales, a 67,773 bale increase over last year. Northern cotton manufacturers required 1,168,955 bales, an increase of 13,312, while southern cotton manufacturers took 1,622,523 bales, an increase of 265,408 bales. These foregoing figures are from the New Orleans Cotton Exchange. For the twelve months ended July 31 there were 5,598,798 bales of cotton consumed in the United States, 3,026,861 bales being taken by mills of the cotton-growing states and 2,571,937 bales by mills in all the other states. Consumption in the cotton-growing states exceeded all the other states by 454,924 bales, an increase of 69,335 bales over the preceding twelve months as compared with a decrease of 96,615 bales in all the other states. These figures are from the census reports.

ELECTRICAL DRIVE IN SOUTHERN MILLS

The installation of electrical drives in southern cotton mills continues to attract the attention of mill owners and the use of electricity, for cotton mill operation, from hydro-electric developments is steadily increasing. Reports are frequent of old mills being changed to the electric drive and of new plants also to adopt this form of power. During the year the Southern Power Co., Charlotte, N. C., has increased its transmissions of electrical horsepower to cotton mills reached by its system and it is now furnishing about 150,000 horsepower in North and South Carolina. About 200 mills are using this company's electricity, the plants having a total equipment of 3,050,000 spindles and 102,000 looms.

Lancashire Cotton Industry in 1915

Many Retarding Influences at Home, and Exports Decline

(From Our Regular Correspondent)

MANCHESTER, ENG., Dec. 15.

THE cotton industry has been so greatly under the control of extraordinary influences during the year that there is nothing to be gained by describing its course month by month. The outbreak of the war in August, 1914, threw the trade into a chaotic condition from which, at the beginning of the year, it was only emerging. Cotton in the closing five months of 1914 declined from 6.86d. for Middling American to 4.58d., and during those months the various trade authorities either suspended all efforts to quote prices of yarns and cloths, or gave them as nominal. What happened to values in that time can be gathered from the fact that the last quoted prices in 1914 at the end of July showed 32s cop twist at 9¾d. per pound, 60s twist Egyptian at 15⅜d. per pound, 32-inch print cloths 17s 10d. per piece of 116 yards, 8¼ pound shirtings 9s per piece of 37½ yards and 10 pound shirtings 10s per piece of 38 yards. When resumed at the beginning of this year, 32s twist was quoted at 7⅜d. per pound, 60s 11⅛d. per pound, print cloths 12/6, 8¼ pounds shirtings 6s 1d. and 10 pounds shirtings 7s. 1d. per piece.

SPINNERS' YEAR UNSATISFACTORY

Cotton, with somewhat violent fluctuations at times, has gradually worked its way up until, at the time of writing, the advance from the beginning of the year, taking Middling American spot at Liverpool as the basis, is over 3d. per pound, 7.77d. against 4.71d. Yarns and cloth have also advanced irregularly, with intermittent checks. In yarns, the improvement has been most marked in the coarse and medium numbers from 50s downward, and most restricted in the finer counts of Egyptian. It was a long time, however, before any spinners worked prices up to a profitable margin, and even now in the higher division many spinners are doing no better than making costs, and not all of them are doing that. Thirty-twos twist may now be quoted at 11⅝d., and 60s Egyptian at 16¾d., an advance of 4⅛d. and 5⅜d., respectively, compared with an advance of 3 1/16d. in cotton. Just before the outbreak of the war, the margin between the price of cotton and 32s was 3 1/16d. and 60s 10⅝d. per pound. The present margin, as above, is 32s 3⅝d. and 60s 9d. per pound, with a comparison much in favor of the lower numbers.

EXPORT OF YARNS IMPROVES

The home demand for yarns has been greatly assisted by the government's demand for war requirements, running largely upon heavy cloths, calling for the lower counts of yarns, while the overseas trade has been even better than last year and not far behind 1913. The Board of Trade returns for November, issued Dec. 7, give the total exports for the eleven months at 173,343,300 pounds compared with 168,561,800 pounds for the same period in 1914 and 192,908,400 pounds for the same period in 1913. The features of this year's exports are the increases to the Netherlands, 55,398,600 pounds against 38,259,000 in 1914 and 35,170,900 in 1913, and to France 35,729,300 pounds against 3,109,700 in 1914 and 4,526,900 pounds in 1913. The gain to the Netherlands has ben made despite the fact that for the last four months yarns have been exported to that quarter only under license and to the "Netherlands Overseas Trust," guarantee that the yarn is for home requirements only.

DIFFICULTIES OF WEAVING MILLS

Complaints from the weaving division have been nearly continuous and well-nigh uniform. Only those mills which have had plenty of army work have done at all well, and from them complaints of idle machinery on account of shortage of labor have been general. The export trade has been seriously cut down. Turkey, once the third largest customer, is cut out entirely since early in the year, taking this year but 8,856,800 yards against 270,737,400 yards in eleven months in 1914 and 333,827,800 yards in 1913 The demand for China has been intermittent and never brisk, and to that quarter the eleven months' exports are 337,577,100 yards compared with 556,257,800 yards in 1914 and 656,155,000 yards in 1913. China trade has suffered from internal troubles, low silver and adverse exchange, as well as from the prohibition of British trading with German firms in China Latterly, with higher silver and more favorable exchange rates, the demand has shown improvement, and if prices of cotton goods were right from the buyers' point of view, a large business would probably be put through. The great shrinkage has, however, been to the East Indies, the exports reaching but 1,840,063,800 yards compared with 2,612,787,100 in 1914 and 3,000,546,800 in 1913. India had large stocks at the beginning of the year, and the distribution of these and accruing imports have been below parity with Manchester prices. Dye difficulties have also been in the way of one of the great staples for the Indian market, dhooties with their colored borders, and are still an obstacle. To Central and South America the exports are about equal to those for 1914, but only half of 1913, as follows: 274,375,600 yards against 275,847,500 and 549,263,000. Argentina, with an increase of 26,000,000 yards over 1914 (109,970,100 against 83,872,900) has been the best feature of this division.

DECLINE IN EXPORTS

The total exports reached 4,374,695,300 yards compared with 5,459,839,600 in 1914 and 6,544,866,100 in 1913. Despite this great falling off in trade, prices of cotton goods of all kinds have advanced very materially, and some lines are quite near to the high watermark of the boom year 1906, and yet they have in most descriptions failed to keep pace with the advance in yarns. Print cloths, referred to above, may now be quoted at 13s. 9d.; 8¼ pound shirtings 7s. 3d., and 10 pound shirtings 9s. 3d. per piece.

SERIOUS SHORTAGE OF LABOR

There has been no general redundancy of goods at any time during the year, although at times supplies of such as print cloths and gray shirtings have accumulated, the reduced business being counteracted by stoppage of machinery. All divisions have been affected by this, some voluntary stoppages, but mainly owing to the large number of operatives who have joined the army.

There have been several occasions when wage disputes threatened to bring about either large strikes or lockouts. The weavers were first to put in a claim for an advance early in the year, but the claim was first shelved for a considerable time, then reasserted practically as an ultimatum, and finally an advance of 5 per cent., beginning on January 1, 1916, was conceded. The spinners later demanded an advance of 10 per cent, from the coarse yarn manufacturers, say from 36s downward, and this in July was compromised on a five per cent. increase basis, conceded by all mills in the Spinners' Federation. Last month an advance was granted bleachers and dyers.

Throughout the year the industry has had to contend with serious difficulties in the way of transportation, both inland and overseas. The railroads have been dilatory in carrying cotton to the mills and in carrying yarns and cloths to domestic buyers and to ports for shipment abroad. The roads are no doubt doing the best they can with their rolling stock under goverment control and their working staffs so depleted by en-

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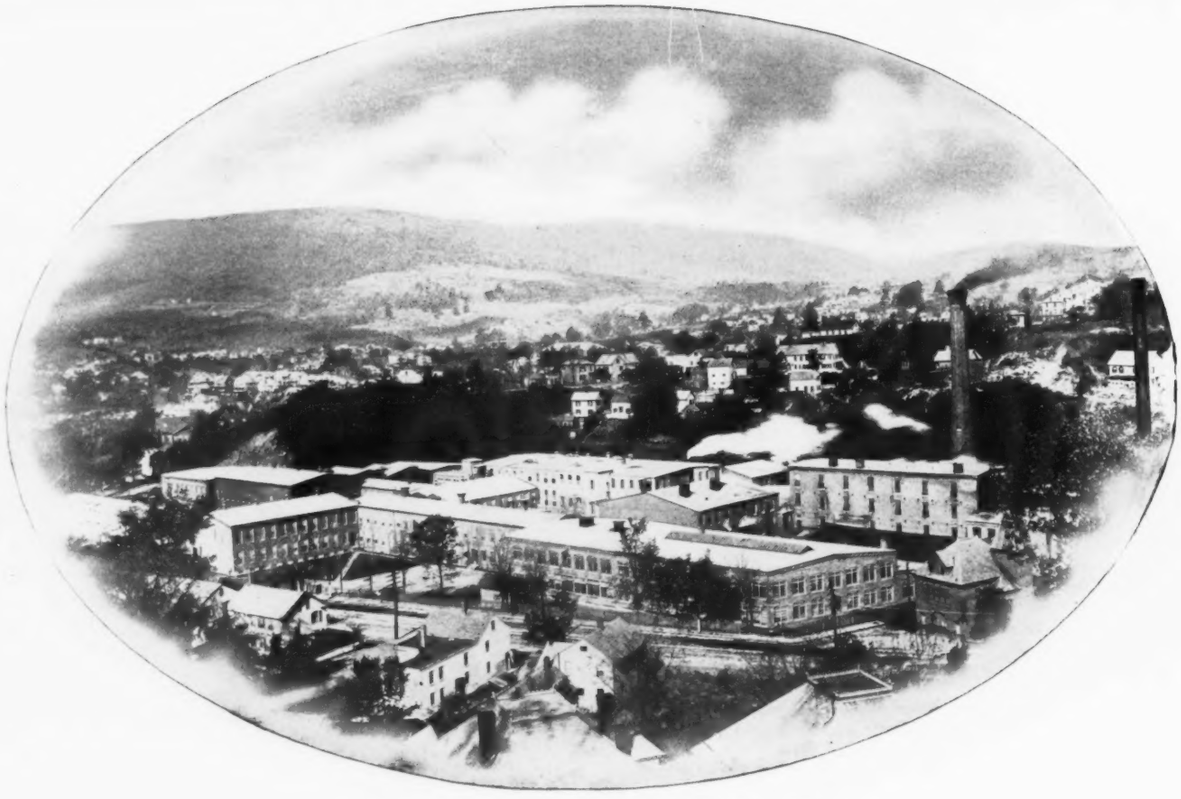

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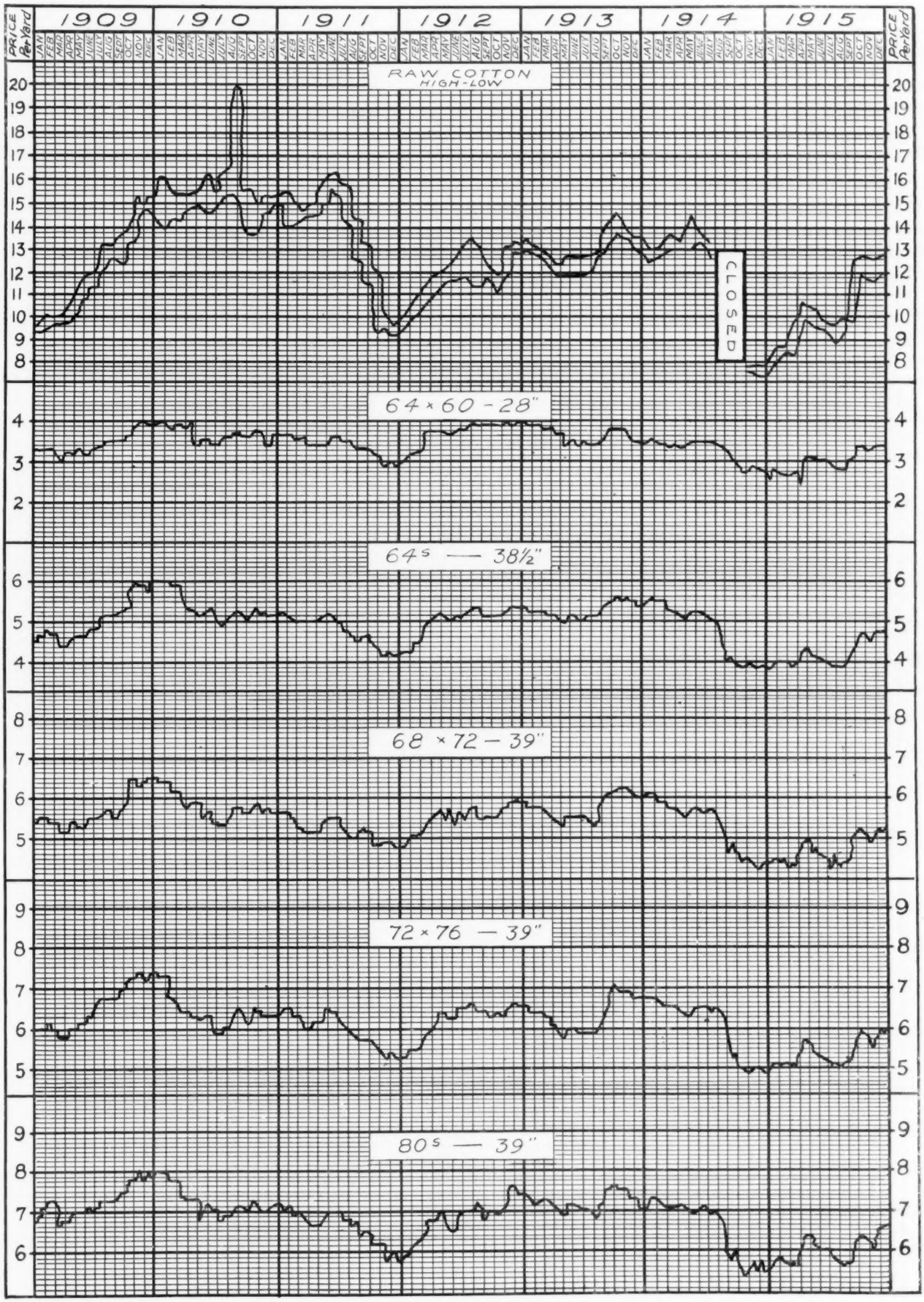

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liments, but the industry in all its branches is suffering. Exports have likewise had to face reduced sailings, abnormal freight rates and high insurance charges, and of relief from these there is no present prospect. Colored goods of all kinds, in addition to these general drawbacks, have had to carry the additional burden of the dye situation created by the war. Signs of amelioration in this are noticeable toward the close of the year as British Dyes, Ltd., formed some months ago under the auspices of the government, enlarges its operations, but there is much to be done before the relief becomes nearly adequate, or the upward movement in dyeing charges is arrested.

The year closes with stocks of yarns and cloths mostly well under control, but with practically all the disturbing elements still in operation and the outlook for the coming year full of anxiety. There is little disposition anywhere to indulge in forecasts, and none will be attempted here.

Confidence in Values of Cotton

Difficulties of Conducting Trade Overcome in Large Measure

THROUGH all the varied perplexities and uncertainties of the past year, confidence in the ultimate value of cotton has remained persistent, apparently unshakable. Ideas as to immediate worth have fluctuated; at times, indeed, price movements have been violent. But large surplus supplies have been carried with a determination hardly to have been inspired by anything short of a firm belief in the future of the world's cheapest textile—of a conviction that if not fully required in the processes of life and destruction during the continuance of the war, they will be readily absorbed in those of reconstruction and replenishment. From this standpoint the apparent surplus becomes less a matter of excess than of delayed distribution. Many in fact, believe that the actual consumption of cotton during the past twelve months, in the sense of destruction beyond the possibility of further use, has been the greatest in the history of the world; that the supplies piled up at our ports and Southern towns would even fall short of re-establishing the ordinary stocks in European warehouses, on the shelves of the shopkeepers, in the homes and wardrobes of the people. Difficulties of exchange, scarcity of ocean tonnage, the increased risks and embargoes upon shipments, the growing need of economy among warring nations—all these factors have played their part in shifting the reserve supply, or Europe's "stock in trade," from the consumers' side of the spindles, to the markets of the producer; from manufactured goods into raw material. Naturally such a change has not occurred without periods of depression and confusion, but the conditions which have drained Europe of its cotton, are also driving European resources into American coffers. Losses forced upon cotton producers at the beginning of the war have been largely recouped, and the burden has been carried with surprising ease. In this, as in various other directions, we have seen the stimulating effect of a general export movement swollen by vast war purchases, the influx of foreign gold, the elasticity of the new banking system, and a national prosperity, based too largely, perhaps, upon the squandering of past and prospective earnings of European generations, but none the less real in its immediate application; with the day of reckoning too remote, its terms too uncertain, to provide a check on the general tendency toward expansion or speculation. Moreover, the burden of available supplies has sensibly diminished. At the beginning of January, 1915, the indicated supply of cotton available for distribution in this country amounted to about 11¾ million bales. At the beginning of this year, on the basis of the official crop estimate with allowances for linters, it is in the neighborhood of 9 millions, comparing with a supply of about 6¼ million bales at the beginning of January, 1914, and 5¾ million bales at the corresponding time in 1913.

THE COURSE OF PRICES

Broadly speaking, and aside from more or less temporary, if not unimportant fluctuations, there have been three distinct price movements during the year followed by a period of digestion and readjustment. First, the rebound from the demoralization occasioned by the first shock of the war, which was in progress at the opening of the year. Second, the reaction, hastened and intensified by the sinking of the Lusitania with its threat of international complications. And third, the advance inspired by the steadiness of remaining old crop holders and the small estimate of the fresh supply.

The first of these movements represented an advance of approximately 4c. per pound. March contracts which had sold at 7.08 in the New York market early in December, 1914, and had recovered to 7.93 by the first of January, 1915, sold at 11.23 on April 23. This advance, however, had served to discount a substantial reduction in acreage; also a more active distribution than had been dreamed of during the gloomy days of the previous autumn. It attracted realizing and also increased offerings from southern spot holders, and the market was hesitating under the weight of these offerings when the news was received, on May 7, of the Lusitania disaster. This proved the signal for more or less general liquidation. Cotton which had been bought for European account with a view to holding it here in readiness for a restoration of peace was sold, while the British blockade of Germany and Austria, which had already been declared in retaliation for Germany's war zone action, began to make itself felt in the volume of exportations. Frequent rallies interrupted the course of the decline, but each of these improvements met increased offerings and by July 10, contracts for October delivery were selling at 8.75, while contracts for March, 1916, delivery were quoted at 9.39, representing a decline of about 3c. per pound from the high level of the early spring. At about this time it became evident that remaining holders of old crop supplies in the South were well prepared to carry them forward, and official confirmation of reduced acreage estimates started the third big price movement of the season. Low condition reports, the increasing activity of domestic mills, and steadily declining estimates of the new yield, combined with a better appreciation of the extent to which cotton was entering into the process of the war, all served to stimulate the determination of old crop holders and by the time new crop cotton began to move in any volume March contracts were selling at 13.47, or about 4c. per pound above the low level of the season. With the influx of the new crop, southern spot markets became somewhat less difficult to deal in. At the same time, a spell of more favorable weather in the South rather shook confidence in some of the smaller estimates of the yield, while it also became apparent that scarcity of ocean freight room, the relatively high price, and high freight rates were seriously to interfere with the export movement even to those ports which remained open to our clippers. Reactions followed extending to a matter of nearly 2c. per pound, but small ginning returns revived confidence in the lower crop figures and recoveries followed with March contracts selling up to 13c. early in December or within 47 points of the high level of the autumn. Since then the market has shown nervousness and irregularity owing to the restricted export movement, frequently recurring fears of international complications, and a withdrawal of speculative support pending some better idea of the coming acreage. At the close of the old year, however, March contracts were selling at 12.48, comparing with the price of 7.93 at the end of the previous year, although the supply of American cotton actually visible in the world showed a decrease of only 6,000 bales, while the visible supply of all growths was 6,048,878 bales against 5,903,603 at the close of 1914.

THE NEW YEAR'S PROBLEMS

Notwithstanding the improvement which has obviously occurred and the facility with which the trade has adapted itself to new conditions, whether imposed by war developments or by the provisions of the Cotton Futures Law which became effective last February, the outlook for the new year is by no means unclouded. It may prove, indeed, that 1916 will bring difficulties and uncertainties little less confusing than those of the year just ended. Reduced as it has been, the supply available for distribution in this country is still a very large one, and at the beginning of the new year, sentiment must hinge upon the problems of its disposition under prevailing export conditions, as well as upon the duration of the war and the outcome of the new planting season. These are the considerations which are expected to enter into the attitude of remaining holders as the season nears it close, in addition to the fact that we are entering the final phases of the old crop year with prices ruling nearly 6 cents a pound above those of a year ago.

QUESTION OF CONFIDENCE

The ability to carry cotton in this country under less favorable conditions with reference to banking and storage facilities than the present has been amply demonstrated. It remains to be seen whether the confidence in ultimate merit will remain unshaken by later season developments, whether, in fact, there will be an adequate incentive for again carrying forward old crop supplies into a new crop at prices so well above the cost of production. Of all the various factors bearing upon this question, there is but one upon which there appears to be no material differences of opinion. For it seems to be generally felt that continued and possibly still greater activity can be expected in the matter of domestic consumption. During the past twelve months the home consumption of both lint cotton and linters has shown a most gratifying expansion amounting to 5,953,218 bales of lint, and 620,705 bales of linters as compared with 5,448,770 and 310,396 respectively for the calendar year of 1914. The year now beginning may, and probably will, show an improvement on these figures, but cotton values must still be dependent upon willingness to hold, or an export outlet, and encouraging as the activity of domestic mills may be, unless holders are dominated by "blind faith" in cotton, the determining forces will doubtless be those exerted by export prospects and the new crop outlook.

CROP AND ACREAGE PROSPECTS

Even under ordinary conditions prospects for the coming acreage and crop can hardly be discussed with any degree of confidence at this time of the year. The weather enters so largely, both into the final acreage figure and the yield per acre, that the trade must await the gradual development of the planting and growing period, and this season there are many considerations which add to the uncertainty of the outlook. The acreage actually planted in 1914, according to the latest figures of the Department of Agriculture was 30,957,000 acres, compared with 37,406,000 in 1913. Only twice in twelve preceeding years had there been any market decrease in acreage. It may be recalled that following the collapse of values after the "Sully year," the South made a voluntary reduction in area. This was brought about by the low prices reached in the fall and winter of 1904, when March contracts in New York sold well below 7c. The acreage, which was estimated at 31,730,000 acres for 1904, was reduced to 26,999,000 acres in the spring of 1905. Again, in 1912, a reduction in acreage was brought about by reason of the decline caused by the big crop of 1911, which forced March contracts in New York below 9c. The reduction in that case, however, may have been partly the result of unfavorable weather conditions during the planting period and amounted to slightly less than 2,000,000 acres. In all three of these instances, the prices responsible, or largely responsible for holding down the area, were under this year's ruling value, and the advance has inspired a general belief in a materially larger acreage next spring. There are, however, certain conditions which would tend to modify a disposition to increase acreage, and also to promote caution in calculating upon a materially increased yield.

These are, the spread of the boll weevil, the scarcity of fertilizer, and the attitude of bankers and merchants to be reckoned with, and thinking men in the South, as well as in other sections, must recognize the uncertainities of the export outlet. Then too, the area sown to winter wheat last autumn was practically the same as last year's in all the more important cotton producing states with the exception of Oklahoma. The reduction of about 460,000 acres in the wheat area of that section, may, with favorable weather conditions, be found under cotton this year, but in the figures for other states there is no sign of turning last year's greatly increased winter wheat acreage into cotton. In Eastern sections of the belt, particularly, the prospects for increased planting are by no means certain. It is there that the scarcity of effective fertilizer will be most seriously felt. It is there, also, that the spread of the boll weevil is reported to be promoting the cause of diversification, and the extent of supplies which may still remain unmarketed next spring is likely to influence the attitude of bankers and merchants in making advances on new crop preparations. There can be little doubt that the reduction of over 6 per cent. in acreage last year was largely the result of financial or credit restrictions placed upon the farmer, and there can be as little doubt that many Southern business men and bankers are again urging the desirability of diversification, until, at least, a better view can be obtained of the peace prospects. Some

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advices coming in from Eastern sections of the belt report that farmers, themselves, are extremely uncertain as to just what they should do with reference to planting, and while the influence of remunerative prices can hardly fail to find a reflection in acreage figures and in cultivation, it is hardly to be expected that such extreme views as expressed in certain speculative circles with reference to increased area will be fully realized.

UNCERTAINTIES OF EXPORT OUTLET

Just as the final outcome of the new crop depends so largely upon weather conditions, the export situation is wrapped up in the duration of the war and the course of events as influenced by war developments. Exports for the calendar year 1915 were surprisingly large. They amounted to 8,314,535 bales, according to the monthly reports of the Census Bureau, compared with 6,320,475 bales for the year 1914. This comparison, however, if unqualified, would be misleading. During a normal season exports are relatively heavy between the beginning of the new crop and mid-winter. Thus the greater part of the cotton taken by foreign countries from the crop of 1914 had been exported by the first of February, 1914, while the movement during the last half of that year, or after the beginning of the war, dwindled to very small figures. An improvement set in toward the end of November, 1914, and the early part of 1915 showed relatively heavy clearances. But since the first of this season, or since Aug. 1, 1915, the volume of exports has shown the restrictions on foreign shipping, and up to the first of January, clearances have amounted to only 2,300,000 bales, against 2,509,000 the previous year; an amount far below the ordinary movement for the five months.

Scarcity of ocean tonnage as well as the growing need of economy abroad, due to the gradual exhaustion of resources and their concentration upon the business of war, and the blockade of Central Europe, have restricted the foreign outlet. Ocean freight rates which in pre-war days used to average around 25c. per 100 pounds on cotton from New York to Liverpool, are now in the neighborhood, of $2.25 to $2.50, while rates of $3.00 per 100 pounds are being paid on cotton from Gulf ports to Liverpool and Manchester. Other costs such as exchange and marine insurance have also advanced, and the parity between foreign and domestic markets has widened to figures unheard of since civil war times, at least. It is figured, indeed, that it costs in the neighborhood of $4.75 per bale to lay down Texas cotton in the English market. The British government has been giving a preference to importations of foodstuffs and munitions of war. It is reported that British steamers sailing from southwestern ports have been instructed to carry at least 50 per cent. of grain in their cargoes. Between these restrictions, difficulties of exchange, and the high freight rates, Liverpool has been taking cotton very slowly, but has also been exhausting its reserve supplies. A large stock of American cotton was carried forward in Liverpool at the beginning of this season, but it has been reduced to comparatively small figures, and much of this is now said to be earmarked to spinners. Toward the end of the old year it became apparent that the situation in this respect was beginning to cause anxiety. Liverpool developed symptoms of extraordinary strength and the differences between the markets widened rapidly. This led to predictions that the British government would find it necessary to take measures of some sort to relieve the raw material situation. This, it was said, might be done by turning over vessels requisitioned for other purposes to the cotton trade, and it was also suggested that steps of some sort might be taken to control the rates of freight. In any case, however, the shortage of ocean tonnage caused by submarine warfare, and the vast use of vessels in supplying armies, the needs of which cannot be neglected, suggest a real scarcity of transportation facilities, while there can be little doubt that such prices as now prevail abroad as well as scarcity of labor in manufacturing centers, will force the most rigid economy in the use of the staple.

In this connection the section of the cotton futures bill which prevents trading by people in this country in the Liverpool market has doubtless been a disadvantage to exporters and indirectly to the southern producer. English importers have been working under various handicaps. In the first place, their operations have been more or less subject to the policies favored by their home government. In the second place they have had to contend with unusual conditions in exchange and with unusual financial conditions. It is quite possible, that had American merchants been able to sell hedges in Liverpool they would have found means to ship cotton to that market on consignment, financed with American funds, and if steamer room was not available, sailing vessels might have been found to carry such shipments. Moreover, in another way the cotton futures bill has worked a hardship upon American merchants. Great changes have occurred in the differences between Liverpool and American markets, and Liverpool merchants have been able to take advantage of these changes through the medium of arbitrage business. They have sold heavily in New York and New Orleans against purchases in Liverpool, and while at one time the difference between the two markets was less than 100 points, it has widened to about 400 points. These profits must, of course, come out of the foreign consumer, but it is probable that exports would have been larger, and that the fluctuations in the differences between foreign and domestic markets would have been smaller, had it not been for the operation of the futures law. As it is, it will probably be found that exports for the balance of the season will be larger in proportion to the amount of cotton cleared during the first five months than is usually the case. Manchester has recently reported an improved business, and Sir Charles Macara is authority for the statement that Lancashire intends to hold its trade in cotton textiles. To do this means that ways must be found to expedite the export movement. In their latest circular, Messrs. Neill Brothers, of London, estimate the consumption of Great Britain at 3,650,000 bales, the Continent 3,300,000, and Japan and China at 450,000, or a total of 7,400,000 bales. Of course, part of this requirement, should it prove as large as this estimate, will probably come out of raw material supplies carried forward from last season, but this estimated consumption compares with an actual export movement so far since Aug. 1 of but little over two and a quarter million bales.

WORLD'S PRODUCTION AND DISTRIBUTION

According to the returns of the Census Bureau the world's production of cotton for the year 1914 in bales of 500 lbs. net was 27,764,000. Of this amount 15,438,000 bales were produced in the United States, 3,826,000 in India, 1,384,000 in Egypt, 1,750,000 in China, and 1,126,000 in Russia, while other countries contributed in the neighborhood of 1,240,000 bales. The world's consumption expressed in bales of the same weight ,for the season of 1914-15 amounted to 19,761,000, of which 3,890,000 were consumed in the United Kingdom, 6,250,000 on the Continent and 1,400,000 by Japan. The consumption of the United States, in bales of 500 lbs. net weight, was 5,429,000 bales. The outlook for the supplies of this year is far from a certain quantity. The official estimate of the Department of Agriculture indicated a growth of American from the planting of 1915 of 11,161,000 bales of lint cotton, in bales of 500 lbs. gross. With an allowance for linters this would point to a total growth of say 11,800,000 bales. Messrs. Ralli Brothers estimate the crop of India at 5,780,000 bales, including a carryover of 900,000 bales and an allowance of 750,000 bales for home consumption. The Egyptian Ministry of Agriculture estimates the crop of India at 4,863,000 cantars, which is equivalent to about 1,018,000 bales of 500 lbs. gross weight, and represents a decrease of about 20 per cent. Little has been heard as to the progress of other growths, and according to Secretary Hester there were 1,450,000 bales of the American growth of 1914 unmarketed and out of sight in the South at the beginning of the present season.

The Year in Figures.

	1915.	1914.	1913.
January:			
May contracts, New York	9.10-8.00	12.54-11.90	12.87-11.69
In sight for month	2,298,922	1,713,034	1,298,808
Ginned to Jan. 16	14,915,859	13,582,036	13,088,930
February:			
May contracts, New York	8.98-8.26	12.16-11.71	12.50-11.84
In sight for month	1,867,631	1,044,988	817,926
March:			
May contracts, New York	9.88-8.32	12.31-11.60	12.17-11.75
In sight for month	1,441,742	741,562	616,330
Final ginning	15,905,840	13,982,811	13,488,539
April:			
May contracts, New York	10.38-9.46	12.77-12.19	12.36-11.22
In sight for month	1,008,386	509,947	657,368
May:			
May contracts, New York	9.88-9.00	14.45-12.46	11.75-11.25
In sight for month	575,056	373,497	372,761
June:			
July contracts, New York	9.62-9.15	13.42-12.52	12.24-11.35
In sight for month	291,109	249,212	206,780
June condition	80.0	74.3	79.1
July:			
July contracts, New York	9.39-8.41	12.96-11.05	12.25-11.70
In sight for month	276,843	89,394	157,560
July condition	80.3	79.6	81.8
Acreage estimate.*	31,535,000	37,406,000	37,408,000
August:			
October contracts, New York	10.02-9.10	Closed.	12.42-10.92
In sight for month	232,783	59,075	364,871
August condition	75.3	76.4	79.6
Commercial crop	15,136,285	14,883,689	13,993,222
Visible-end season (Am.)	3,099,881	1,691,808	1,332,140
World's consumption season	14,134,000	14,541,000	14,715,000
September:			
October contracts, New York	9.71-12.22	Closed.	14.06-12.32
In sight for month	1,268,908	733,235	1,626,570
September condition	69.2	78.0	68.2
Ginned to Sept. 1	463,896	480,317	799,099
Ginned to Sept. 25	2,904,063	3,393,752	3,246,655
October:			
December contracts, New York	11.70-13.00	Closed.	14.12-12.88
In sight for month	2,016,565	1,960,519	2,937,051
October condition	60.8	73.5	64.1
Ginned to Oct. 18	5,710,824	7,619,747	6,973,518
November:			
December contracts, New York	11.28-12.37	7.48-6.85	13.75-12.84
In sight for month	1,972,700	2,460,350	2,843,247
Ginned to Nov. 1	7,382,578	9,826,912	8,830,396
Ginned to Nov. 14	.....	11,668,240	10,444,529
December:			
December contracts, New York	11.64-12.61	7.49-6.65	13.27-12.01
In sight for month †	1,950,000	2,479,441	2,379,495
Ginned to Dec. 1	9,705,877	13,073,386	12,088,412
Gov't crop estimate	11,161,000	15,966,000	13,677,000
Ginned to Dec. 13	10,303,253	13,972,229	12,927,428

* Revised figures Dec. 15th, 1915, 30,957,000; the final figures are given for 1914 and 1913.
† Estimated.

CHINA TRADE

(*Continued from page* 43)

The overstocking of the China market with American cotton cloth by the shipments of 1905-1906 was not worked off until well along in 1908, when a more cheerful attitude of Chinese merchants led to purchases resulting in the much larger and more encouraging shipments of 1909. In 1910 the China ports speculated in rubber plantation stocks, foreigners and natives together, and in the collapse Shanghai alone is said to have lost $50,000,000 in cash taken out of trade and from the country.

RETARDING INFLUENCES

In 1911 there was the revolution and the establishment of the republic, in 1913 the abortive rebellion, in 1914 the effect of the European war, particularly severe commercially in all outlying countries, and in the year 1915 not only the continued burden of the great war but the depressing influence of the aggressive Japanese attitude toward China, and the change back to a monarchical form of government. To a people peculiarly sensitive to political alarms, out of the sorry experience of centuries among those who have anything to lose, whose only desire is to be let alone, because they know themselves helpless in any event, such a succession of shocks is enough to disorganize any trade.

But meanwhile, and more potent than any influence within the political field, was that process set up by China itself within its anomalous financial system, not immediately recognized in commercial circles, which has been the chief influence in the loss of our trade, and caused a depression from which there has not as yet been recovery.

UNSTABLE CURRENCY CONDITIONS

In China there is no currency properly so-called, the medium of exchange being silver bullion. For the purchases of the people, the mass of population, transactions necessarily small where a workman earns the equivalent of ten cents gold a day, out of which he must feed, clothe and shelter his family, copper coins, called "cash," have been in use for many generations. Incidentally of recent years, and in centers of trade, there have appeared, besides the Mexican and other similar "dollars," local currencies of small silver and issues of unsecured paper money without central authority or provision of redemption, and having no fixed value even in the places of origin. Moreover, there is no common standard of fineness for silver bullion. Each province, and sometimes each of several parts of a single province has a standard of its own, and the resulting intricacy of exchange values in settlement of the transactions of

$3,000,000 IN SALES

THE BOSTON TRANSCRIPT

The most conservative newspaper in America, in its issue of May 2, 1914, said of the Fourth National Textile Exhibition:

TEXTILE SHOW CLOSES TONIGHT

Manufacturers Said to Have Booked Orders for $3,000,000 Worth of Machines

This is the closing day for the textile exhibition in Mechanics Building. It has been most successful, both in size and attendance, and it is reported that sales amounting to about $3,000,000 have been booked by the dealers.

That's One of the Reasons Why We Predict that the

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APRIL 24th to 29th

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internal commerce is beyond the capacity of any but a Chinese exchange dealer. The silver coins have been debased and counterfeited, and the paper money discredited. Far worse than all this, the copper "cash" of the people has been reduced to the basis of token currency by the issue of a flood of new coins, put out ostensibly to supply a need for more copper money. These were turned out in vast quantities, from many provincial mints, so far in excess of any possible capacity of the country to absorb them quickly that they have fallen to a fraction of their face value, ten cash, and have carried the old coins with them, so that the latter have never had their former buying power by half. This process, begun in 1905, was not for some years effective, but from 1910 onward has been a potent factor in the course of the trade in cotton goods. Coming upon lower silver the effect has been disastrous. Years ago, when silver was worth twice its present value, it was generally considered that taels 3.00 per piece of 40 yards for the leading 2.85 yards sheeting was the limit of consumptive demand. On today's first cost here, assuming a normal freight rate, not now obtainable, the silver cost at Shanghai of such a piece of goods would be taels 5.00. But that is only part way. At the earlier price there had been no debasement of the copper cash with which the individual Chinaman buys five yards for a suit of clothes. Now he finds that it takes twice as many cash as it did then, and he gets no more of them for his labor. He has no silver, and there is no escape for him from the double burden. He must have clothes to wear, so he buys the cheapest cloth he can get, though he would much prefer to buy under the brands he and his father, and very likely his grandfather, had learned insured to him durable goods. This condition of affairs is understood by the enlightened men now in control of the government in China, and some measures, all that is within their power, have been taken to correct it. The task is beyond the present economic strength of China, and probably must be taken up from the outside in a friendly spirit. It is believed that this was in prospect just before the present great war, but had to be abandoned. Nothing will help China so much as the establishment of a modern system of currency of uniform value throughout the country, not difficult in proportion to the magnitude of the interests to be benefited, not only of China but of all trading and neighboring countries. It would be an investment sure to pay large returns were it possible for enterprise to take that direction.

SUBSTITUTES FOR AMERICAN GOODS

What the Chinese dealers and consumers have been taking in substitution for the American cloth formerly imported is in part recorded in current statistics, frequently set out in rebuke to our manufacturers by those who do not understand. The most recent and exact statement of the largest source of such supply is the report of export of cotton goods from Japan for the nine months ending September 30, 1915. There was sent out from that country in that period "cotton tissues" to the amount of gold $13,264,688 (at 50 cents for a Yen) of which $10,624,530 went to China, excluding Hongkong, and including Japanese territory in China. Specific items of this export are:

	Yards.
Grey sheetings and shirtings	94,703,854
White sheetings and shirtings	4,309,543
Drills and jeans	73,415,988
Cotton flannels	10,079,215
Imitation nankeens	61,390,180

most of which probably went to the North of China. The sheetings and drills are the equivalent of 240,696 bales of American goods, and the flannels to 16,832 cases. These Japanese cloths sell at about 25 per cent. less than those they have supplanted. How they are made and what determines their cost is described in the report upon "Cotton Goods in Japan," made by W. A. Graham Clark, issued by the Department of Commerce in 1914, Special Agent's Series No. 30, the best report ever made upon the cotton industry of Japan. That the conditions which have helped the competition of Japan for the cotton goods trade of China and made it formidable remove the reproach from our own manufacturers, if any is laid upon them, is apparent from statements by Mr. Heintzelman, Consul General of the United States at Mukden, Manchuria, in the October, 1915, number of the *Far Eastern Review*, saying, "With little or no competition the Japanese are unloading in Manchuria the products of their home labor, and favored by Government subsidies, special railway rates, preferential customs treatment, and exemption from internal taxation. In addition to these special privileges and aids to trade the Japanese are penetrating all parts of the country, locating in places not open to international residence and trade." These statements of United States Government officers summarized are that Japanese cloth sent into China is made of inferior cotton, Indian and Chinese, weighted to about 30 per cent., manufactured and marketed under artificial conditions which eliminate much of the cost that goods of other foreign origin have to meet.

OTHER COMPETITION

Another source, small as yet but of growing importance, is in the mills of China itself. The peculiar advantage enjoyed by these establishments, besides location within the source of supplies for manufacturing, and at the door of the consuming market, is in getting their raw material and labor on a silver basis.

USE OF HAND LOOM

The hand loom, always producing much of the cloth used by the Chinese people, has had in this time of hardship a new value. The little the working man can spare for clothes from the small sum he receives in depreciated money will buy some foreign yarn for warp, and with hand spun yarn for filling his wife and children can weave a cloth that serves to cover the family. This process will probably continue until the lot of the people improves.

Other sources of supply need not be considered here; Great Britain, whose competition on coarse yarn heavy weights disappeared before American cloth many years ago, Italy, which never gained a foothold in the China market, and Austria, whence cloth came occasionally in what appeared to be a sort of "dumping" operation.

HOW TO REGAIN TRADE

The pressing question is how to save what is left of the demand for American cloth and perhaps get back the trade that has been taken away. That the consumption of foreign made cloth has not ceased is shown by the Japanese exports to China noted above. How much of it remains for American cloth is expressed better by deliveries of the latter to the natives than by shipments from here. Of recent years there have been:

	Packages.
1909	196,182
1910	144,049
1911	120,777
1912	117,252
1913	111,621
1914	73,105
1915	56,420

Going back of 1914-1915, when conditions in China have been severe upon trade, and allowing for the political disturbances that have been almost constant since early 1911, it is fair to assume that a present market could be depended upon for perhaps 100,000 packages a year, a volume of business well worth doing. The trade factors to be considered and dealt with in the effort to hold and increase it are the cost of our goods to the Chinese, the method of conducting the business, the buying power of the people of China, the Japanese competition, and the political prospect. A chapter could be written about each, and it is difficult to be brief and yet clear. These factors are of relative importance according to the point of view, but may be taken in this order for the present purpose.

MEETING COMPETITION

It is true of any market that there is a limit beyond which advancing price will restrict consumption and stimulate substitution. It is elastic, to be sure, in China as elsewhere, but operates more quickly where buying power is low. If first costs here are high, the task in China is going to be harder. There are those among the advisers to business men who call upon our manufacturers to sell to foreign markets irrespective of cost, but that is a course of unreason, discussion of which is futile. Perhaps it may be necessary for our manufacturers to adjust their processes and costs to the present ability of the Chinese buyers, and produce goods that can be marketed to compete in quality and price with those which have within recent years displaced the American cloth. Moreover, it may be that it is possible now to compete successfully for the large trade in China for fine yarn grey and bleached cloth, as has been intelligently suggested by one experienced observer, a field into which the mills of Japan have not been able to enter successfully. It seems worth trying out.

METHODS OF DISTRIBUTION

On the method of conducting the trade in American cotton cloth with China much criticism has been expended, some finding in it the chief cause of the present smaller volume. It is urged that the practice of two great distributors of American products, hardly mercantile in their operation, so far as cost and returns are concerned, should be followed, and the Japanese imitated in their barter, giving of credit and penetration beyond treaty limits. There is possible now, in the less commanding position of the Shanghai merchants, what could not have been undertaken a few years ago, when the Piece Goods Guild at that port was powerful and prevented any trespass by foreign traders upon their markets in the whole North of China. It is quite likely that an adjustment to this new condition will be made. But it must be realized that expansion by numerous distributing stations will add greatly to the cost of doing the business. As it has been conducted, probably no distribution in the cotton goods trade at home or abroad has been so cheaply made as to consumers in China. To establish outlying branches, equip them with capable staff and provide foreign supervision, as will be necessary, will be a large and expensive undertaking. Men who can be depended upon and are willing to make the sacrifice of living in small and remote places are not easily found, and will not go for as small pay or profits as will the Japanese. Where competition is to be set up against an inferior article, which is being marketed on a basis of artificial cheapness, expense cannot be added offhand to the better and therefore higher cost product. Doubtless the process of adjustment will be gradual, with a near approach by establishment of branches and depots in the larger cities, which could be made self-sustaining.

On the course of silver as affecting the financial status of the Chinese people no one can have an opinion worth expressing. There is no present prospect of establishment of a fiscal system in China that will embody an adequate and stable currency. The revenues of the government were becoming more dependable, the confidence of the people in the central authority increasing, and a beginning may be possible on their own initiative. The crops for several years have been abundant, without flood and famine or other catastrophe, and have this year at least sold for good prices. There are the bases of prosperity in the land. If only the people could look to the future without misgiving there could be found encouragement to expect better commercial conditions.

JAPAN'S FUTURE COMPETITION

As to Japan, it is only reasonable to suppose that the competition for the China trade will be pressed to the limit of capacity of production. Not counting the hand looms, from which is said to come the imitation nankeens, the present equipment is about 30,000 power looms, run night and day, some of the product for the home trade under a heavy protective tariff. The competition is artificial, but that is Japan's affair. What is being done is a hazardous experiment in economics. It cannot be possible to subsidize every industry and enterprise indefinitely, for the cost of it must come from taxation upon those without power of resistance, to which there is a limit.

Into the political field who can throw his vision? China has been called the land of the unexpected, and the events of recent years fix the title. It cannot be predicted, as the stage is now set, that the approaching years will bring the peace and quiet so greatly needed for the growth of the nation toward modern progress. What may come of recent developments it is too soon to discern. The president, now the monarch elect, is a very great man, and it may well be that he knows that by his new power, and the prestige of a personal ruler among a people to whom the scheme of a republic gave not even the shadow of an idea within their comprehension, he will secure a constitutional government more quickly and surely than could have been obtained by the rather vague republican establishment by which he has undoubtedly been impeded. It is greatly to be wished that China could be left to work out her political future, with such light from the development and growth of other countries as she chooses to be guided by. For China the danger is still from without rather than from within her borders.

NEED FOR PATIENCE

The purpose of these remarks is to show that the decline of the export of American cotton cloth to China is not the result of a lack of interest on the part of manufacturers or merchants, nor from any other one cause; that the situation is complicated, some of its factors to be met with patience and perseverance, at least one of them contravening the laws of economics; that there is still a sufficient volume of the trade left to be worth doing. There is no panacea for the condition of affairs which some find so hopeless. It requires work and endurance, such as were given in building up the trade over the forty years noted above, and such methods as will commend themselves to the men who will have to do the business. The advisers must not be impatient if all their suggestions are not adopted instantly, perhaps not all of them at any time.

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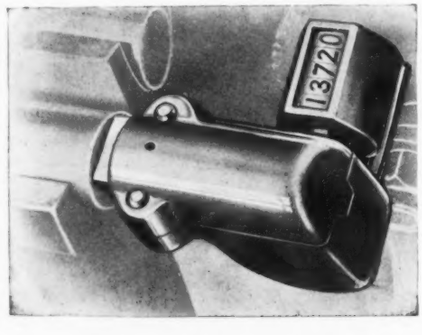

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The Cotton Industry of Japan

By Charles Richards Dodge

THE history of development of Japan's cotton manufacturing industry is a story of remarkable achievement. The industrial advancement of the country had its beginning practically with the opening of the Meyi period, 1867, when the emperor of that name ascended the throne and brought about the restoration of the Imperial Government. Since that event Japan has come out of seclusion and sought world knowledge in all matters pertaining to the useful arts and manufacture, and through the encouragement of intercourse with Europe and America has, in a measure, adopted Western ideas and Western culture.

GOVERNMENT ESTABLISHED MILLS

Realizing the importance of increasing the productions of the country, of promoting manufacture and advancing commerce, the government made every effort to encourage new industries by modern processes, and to this end sent graduates of technical schools to foreign countries to study modern methods. The government at the same time established and managed model factories in different industries, and among them two model cotton spinning factories, equipped with machinery purchased in England. Ten years later, when the students sent abroad had returned, all of these model industrial establishments were disposed of to private capital, and by 1880 only a woolen factory remained in the hands of the government. In 1887 the country could boast of 880 industrial establishments of ten or more workmen each, with a grand total of 63,000 operatives.

During these two decades modes of dress also underwent a change as a result of the influence of occidental civilization, causing a demand for new kinds of textile fabrics, and necessitating the utilization of dobby and jacquard looms. These machines, which were first installed at Nishijin, Kiryu and Ashikaga, are now used by weavers throughout the Empire. The introduction of cotton spinning naturally exerted a great influence on the cotton fabric industry, and new weaves appeared that had never been seen before. Thus the development of cotton spinning, as well as the spinning of silk yarns, caused a considerable increase in the production of textile fabrics, and latterly the utilization of the power loom has rapidly increased.

SYSTEMATIC DEVELOPMENT

After 1887 the varied industries generally made systematic development, the cotton spinning industry especially, although the economic depression of 1890, and the war with China a few years later, checked for a time the material advance. However, by the close of the third decade, 1897, the varied industries of the country represented a capital of $75,000,000, the number of factories employing ten or more men having increased to 7,278, with a total of 450,000 operatives. In 1912 the 8,705 establishments on record had more than doubled the number of work people, the larger number being women, the total production of textile industries alone amounting to a value of $155,000,000 a year. Such has been the remarkable industrial development of Japan in 45 years, cotton spinning and the manufacture of cotton goods taking front rank among the varied industries, the production of cotton yarn alone reaching a total of 557,000,000 pounds in 1912.

HOME-GROWN COTTON

Cotton growing in Japan is an older story, as the growth of the plant is said to have had its beginning in the sixteenth century, although one writer states that it was introduced as early as 781 A. D. It was not until the seventeenth century, however, that the culture began to spread as an industry, continuing down to the present day. Mr. Estabrook, chief of the Bureau of Crop Estimates, Washington, informs me that according to the thirtieth statistical report of the Department of Agriculture of Japan, the crop of 1912 was 7,251,241 pounds, and that of 1913, 6,398,849 pounds. On the basis of 3 pounds of unginned to 1 pound of ginned cotton, this would be equivalent to 5,057 and 4,462 bales of ginned cotton, respectively, of a net weight of 478 pounds each; or 2,417,246 pounds in 1912 and 2,132,836 pounds in 1913. Another authority makes the general statement that Japanese cotton stands at 60 per cent. seed and 40 per cent. lint, at least for the finer grades of long staple, such as are produced in the northern edge of the region. Handy, in his work on the cotton plant, says:

"The quality of Japanese cotton—at least that produced in the best cotton districts—is good, though the staple is considerably shorter than the ordinary tree or shrub cotton. The staple is seldom more than 1.8 centimeters in length. The best cotton is elastic and glossy, but the gloss appears to be more a result of climate and locality than of variety, a damp climate being unfavorable to the production of glossy fiber. The cotton of the damp San-indo region has little gloss, while that of the neighboring provinces, especially that of Osaka-Fu and Wakayama-Ken, possess a very good gloss. The last named lint is considered the best. It is of medium length, soft, very elastic and as glossy as silk. The strength of the lint in the province of Suo is well known. That produced in the San-indo district is mostly short stable, hard and without gloss."

RAW COTTON IMPORTS

With the rapid growth of the manufacturing industry Japan has been obliged to import a great deal more cotton than the country produces. Twenty years ago only a very small portion, perhaps one-tenth, of the entire supply of imported cotton came from the United States, the greater part coming from India and China. Now this is changed, as in a recent year over 25 per cent., or thirty-two million dollars' worth, of cotton has been purchased in the United States in a single year. Here are the figures for three years:

Year.	Bales.	Pounds.	Value
1912	398,013	209,218,378	$23,641,186
1913	464,426	245,364,014	32,370,588
1914	355,398	187,349,004	19,389,404

Japan's total imports of raw and ginned cotton from all sources in 1913 amounted to a value of $116,799,593.

Cotton was first spun in Japan in 1861, when Margius Shimadzu purchased spinning machinery in England and laid the foundation of the industry. In 1912 there were 93 factories with a paid-up capital of $33,080,637, employing 2,212,767 working spindles, producing 563,670,000 pounds of yarn. While the factories are located in 22 places, the leading centers of the industry are Osaka, Tokyo, Hyogo and Aichi, these four cities supporting 52 of the 93 factories reported, there being 20 in Osaka alone. In the decade from 1903 to 1913 there was an increase of 17 factories in the Empire.

RANGE OF PRODUCTS

Coming now to the manufacture of cotton goods, the list shows a considerable range of products. Silk and cotton mixtures, embracing figured fabrics, satins, crepes, "futa-ko," etc., are prepared to the value of $14,900,000, chiefly in Kyoto, Tochigi, Aichi, Saitama and Gifu. Pure cotton cloths, cotton flannel, Kasuri cloths, crepes and cotton towels are manufactured to the value of $76,350,000, the cities of Osaka, Aichi, Wakayama, Ehime, Tochigi and Miye being the leading centers of production, though a dozen other places could be named. In Osaka and Aichi alone the value of these manufactures amounts to $17,000,000 a year. The manufacture of cotton crepe appears to be a distinctively Japanese industry, the production reaching a value of over $2,500,000, besides crepes of silk and cotton mixed, worth almost as much more.

EXPORTS OF COTTON MANUFACTURES

Japan's tremendous advance in textile manufacture is conspicuously shown in the tables of imports and exports published by the government. In 1868, the first year of the Meiji regime, the chief articles of import were cotton cloth, cotton yarn and woolen goods, the chief exports being tea and silk, comprising about one-third of the total export trade. With advance in manufacturing industries, and the increase of home production, in a short time the limit of the home demand had been reached, and it became necessary to find an outlet for the surplus, with the result that, at the present time, such goods as cotton yarn, cotton cloth, including calico, formerly supplied wholly from abroad, have become chief articles of export. The present production of cotton yarn particularly is so great that now only fine thread is imported. On the other hand raw materials are being imported in ever increasing quantities. As an instructive showing here are some figures of exports of cotton manufactures for the two periods, 1893 and 1913—covering only two decades:

Goods.	1893.	1913.
Cotton yarn	$29,588	$35,498,769
White cotton cloth....	.....	3,020,592
Cotton crepe	293,485	945,093
Cotton flannel	140,575	623,797
Twilled cotton cloth..	.....	4,220,795
Cotton towels	.....	1,320,788
Cotton knit goods....	66,135	4,423,709
Totals	$529,783	$50,053,543

The larger part of the exports of cotton goods are to Oriental countries, or the East, as British India, Dutch India, the Asiatic Russian territories and China principally, although in the tables of United States imports from Japan appears the item of cotton goods to the value of $305,198. It is worth noting that in the world trade with Japan the United States stands first, our imports from that country amounting to over ninety-two million dollars, while our exports make a total of over sixty million dollars.

IMPORTING COTTON MACHINERY

All that appears in the foregoing statements goes to show a material prosperity that any nation might be proud of. There is every indication that the high water mark of Japan's advance in textile, especially cotton manufacture, has not been reached. Here is a significant item in the tables of imports for 1913: Cotton spinning machinery to the value of over $2,500,000.

JAPAN AS AN ADVERTISER

As proof that Japan is a good advertiser of her manufactures, reference can be made to her prominence as an exhibitor at international expositions, such as those held at Chicago, St. Louis, Paris and at the recent exposition in San Francisco. Here, among her superb exhibits, are shown in interesting variety such cotton manufactures as dress goods, calicoes, cotton cloths, window curtains, printed scarfs, table covers, table cloths and napkins, towelling, crepes in endless variety, cotton flannel, braids, shoe strings, ornamental twines and many other novelties. In the list of 50 exhibitors of cotton goods many large concerns are represented, among them a prominent establishment located at Tokushima, with an annual output equal to 1,300,000 yen, and employing 5,000 operatives in the production of gassed yarn, broad cotton crepe, claimed to be ideal for bathing suits, shirts and other clothing.

COMPARISON WITH OTHER INDUSTRIES

A brief reference to Japan's textile industries as a whole may not be out of place, as it affords data for comparison. It has been shown that the production of silk and cotton mixtures in a single year has amounted to $14,500,000 and of pure cotton fabrics $75,000,000. Adding to these figures $58,500,000 for silk fabrics, $2,150,000 for linen goods and $14,297,650 for woolen products, the grand total foots up $168,500,000. It will be seen by these figures that the cotton goods industry, exclusive of cotton knit goods, and yarn spinning, (the figures for which are not at hand) amounted to almost $15,000,000 more than the products of all the other textile industries combined. It is to be regretted that the value of the 564,000,000 pounds of cotton yarn produced cannot be stated, as it might make the sum total of Japan's cotton manufacturers one hundred millions more, for the exports alone of cotton yarn, in 1913, amounted to $35,998,500 and of cotton knit goods $4,400,000.

[Late reports, received since Mr. Dodge prepared the above able article, show recent orders for 410,000 spindles to be installed in Japanese cotton spinning mills.—Editor.]

Popularizing Bleached Textiles

At the recent meeting in Chicago of the western members of the National Association of Hosiery and Underwear Manufacturers, there was some discussion of a national advertising campaign to stimulate the use of bleached goods and thus minimize the scarcity of dyestuffs. It now develops that the Massachusetts Laundrymen's Association is conducting a publicity campaign through its members that may prove a powerful factor to this end if followed by other state or national organizations. Its purpose is to protect laundries against claims for damages due to fugitive colors in washing, and a series of circulars are being sent to the public warning them of the seriousness of the dye situation and advising them to use white whenever possible. One of these circulars is headed "Go to White" and is as follows:

"To-day those industries depending on dyes are practically at a standstill. Most, if not all, of the dyes used come from abroad, and owing to the terrible conflict going on in Europe the importations of foreign dyes have entirely ceased. The stock on hand is practically exhausted and the manufacturers of colored goods are forced to use inferior dyes. At the present time, there are practically no fast colors manufactured in the United States, notwithstanding all newspaper reports to the contrary.

"As a result of this condition, while the European war lasts and for some time after its close, we must expect to have colors that will run when washed.

"There is no known method whereby we can wash these fugitive colors so they will not run.

"Therefore, we urge our patrons to purchase as many white goods as possibe until such time as our manufacturers here in the United States can produce fast colors, and by so doing, help lift this great country of ours out of the deplorable condition in which we now stand as regards the dye industry."

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A Permanent, Light-Diffusing Paint for the Factory Interior **The Paint That Sparkles O'er with Light**

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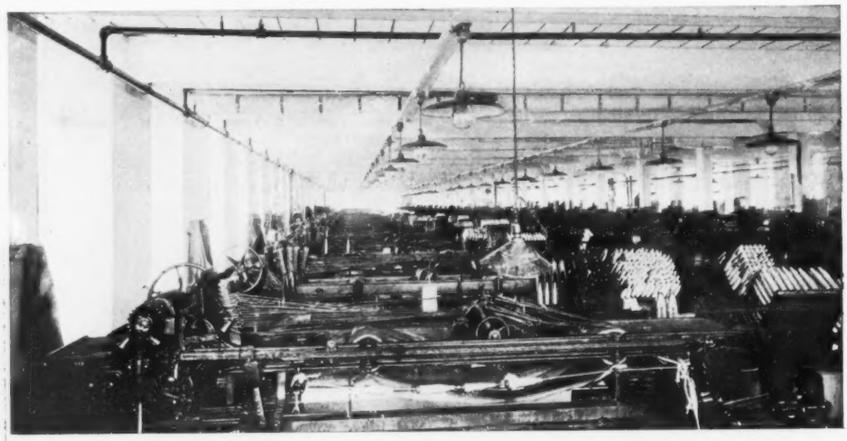

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Materially Reduces Bills for Artificial Light

Dispels the Gloom
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Wouldn't it pay you right now to Investigate the Merits of this Sparkling, Shadow-Chasing White Paint, which has proven its Efficiency in Hundreds of the Largest Mills? What we have done for others we can do for you.

Write TODAY for Descriptive Booklet and Paint Panel

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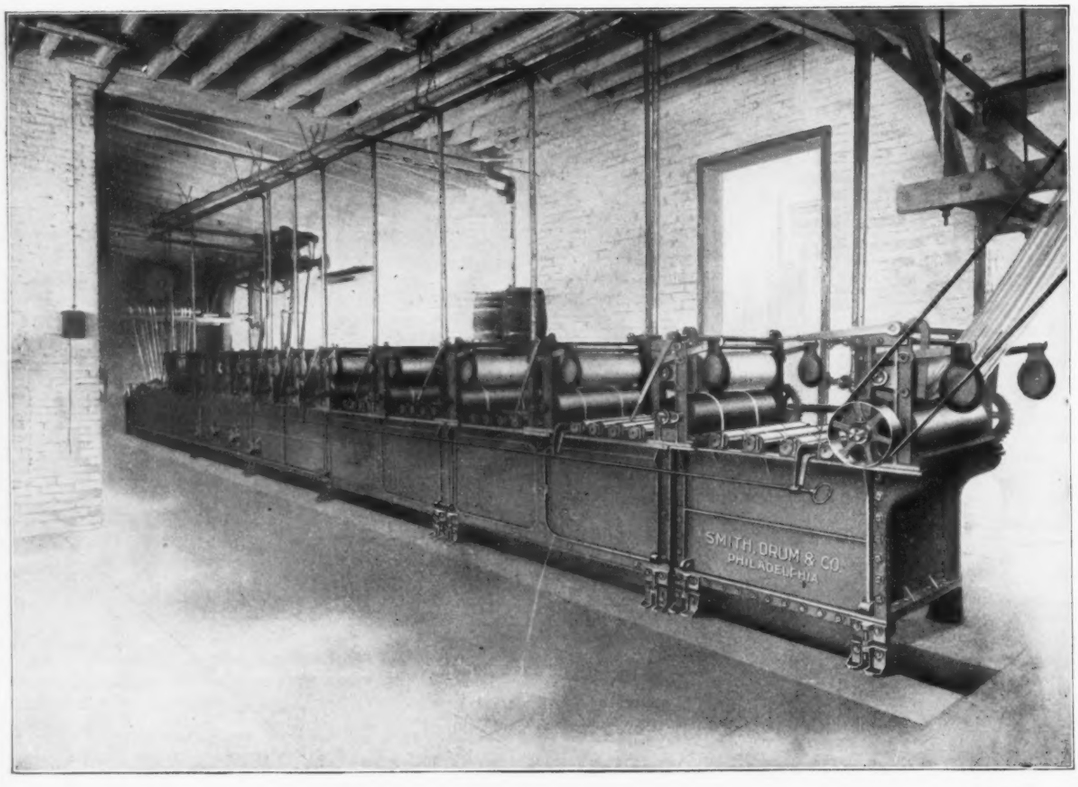

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Our complete equipment with the use of

Pure Water

from our own

Artesian Wells

enables us to turn out highest grade

Quality Yarns

Cotton Yarns Record Good Progress in 1915

Combed Yarn Business Expands

Big Tire Yarn Trade and Lessened Cloth Mill Competition

THE outstanding features of trade in eastern combed and fine count cotton yarns during 1915 were the marked expansion in demand from tire cloth mills, lessened competition from cloth mills, restricted imports and increased exports. Export business was not as important a feature with eastern as with southern mills, but the former have benefited indirectly through lessened competition from the South. The decrease in imports was not nearly as large as appeared on the surface, but foreign competition has been materially restricted, and would have been felt much more keenly if business with domestic spinners had remained as dull as it was in 1914 and in the early half of 1915.

NO CHANCE UNTIL LAST SIX MONTHS

The first six months of the year were quite as discouraging to most spinners as was business during the greater part of 1914. Early in the year there was a moderate reaction from the dull conditions and low prices ruling the latter part of 1914, and by July prices had advanced about 15 to 20 per cent. above the low level at the opening of the year. This advance was partially due to the rise in prices of staple cotton, but more largely to the lessened competition with cloth mills. The latter had been benefiting from decreased importations and the majority of them needed all of their yarn production for their own consumption; this phase of the situation showed a further improvement during the fall, when many cloth mills became buyers of yarn, instead of sellers. It was during the last four months of 1915 that the most radical improvement in business and advance in prices occurred. Eastern spinners had been operating very conservatively up to this time and had steadfastly refrained from allowing stocks to accumulate; therefore when the spurt began it found them unprepared to take care of extra business for prompt delivery, and the advance in prices, accentuated by rising values of staple cotton, was very rapid.

The poorest part of the market throughout the year for eastern spinners, as well as those in the South, was on hosiery yarns, both carded and combed; yet during the last three months there has been a marked improvement in demand for combed yarns of high grades, with a much less noticeable change in demand for carded and low-grade combed yarns. It was possible to buy eastern combed peeler cones last January on a basis of 19c. for 10s; these had advanced to about 22½c. in July but were even lower in September; since then, however, prices have advanced steadily and are now firm on a basis of 29 to 30c. for best spinnings. The course of the market on fine counts is well illustrated by the price movement of 2-60s combed peeler skeins, which opened the year on a basis of 45 to 46c. for eastern and 42 to 43c. for southern. Some eastern yarns could have been obtained at that time as low as 44c. and southern at 41c. In July, eastern 2-60s had advanced to 52 to 53c. and southern to 48 to 49c. At the close of the year prices of eastern 2-60s ranged from 65 to 70c., and best southern yarns sold at 60 to 62c., an advance of about 50 per cent. above the low point reached in the year.

BIG EXPANSION IN TRADE

The outstanding feature of the year in the combed yarn division of the market was the wonderful increase in demand for tire cloth yarn. It was based upon an even more remarkable expansion in the number of automobiles used in this country, and upon the fact that there had been little increase in the production of tire cloth yarns for several years. To realize the marked change in this part of the market a knowledge of the growth of the automobile business is necessary. It is the number of automobiles in actual use, plus the annual sales, that are piling up a permanent increase in the demand for tire cloth and yarns. In 1912 there were only 1,000,000 automobiles in this country, yet this is the estimated production and sales for 1916. In 1915 the sales aggregated 900,000. At present 2,500,000 automobiles are in daily use in the United States. There is such a variation in the size and quality of tires that it is difficult to deduct even an approximate estimate of the quantity annually consumed, and attempts to make such an estimate are further complicated by the variation in the life of tires. Furthermore, there are no statistics showing the annual consumption, or the annual production of tire manufacturers. However, even a rough estimate may prove of interest. It is probably safe to assume that, allowing for waste in weaving and in tire manufacture, it requires an average of five pounds of yarn to each tire. The million new automobiles to be produced during 1916, allowing an extra tire for half of this number, will require 22½ pounds of yarn per machine, or an aggregate of 22,500,000 pounds. It is safe to estimate that, before the end of the year, at least half of these million machines will need another new tire, and this means 2,500,000 more pounds of yarn. It is a conservative estimate that the 2,500,000 automobiles already in use will need an average of at least one new tire during the year, and this means approximately 12,500,000 more pounds of yarn, or a total consumption during the year of 37,500,000 pounds of yarn. At the close of 1916 these figures will have to be revised to allow for 3,500,000 automobiles in use, and at least another million to be produced in 1917. Statisticians claim that there are 10,000,000 families in the United States who can afford an automobile of some kind, so it can be seen that Col. Mulberry Sellers, of eyewash fame, may yet be cast in the shade by the wonderful development of the automobile business. In view of the estimates previously mentioned it can be safely assumed that tire yarn sales during the last three months have aggregated considerably more than 30,000,000 pounds. At all events, every tire cloth yarn mill in the country, and every sales yarn mill producing tire yarns, is pushed to capacity, while the majority are increasing their loomage and spindleage as rapidly as possible. The marked improvement in the tire yarn market is evidenced by the fact that 23s combed Sea Island, which could have been bought at the opening of the year at 35 to 38c., are now firm at 55c.; Egyptians of the same count that sold at about 30c. last January are now 45c.

Yarn Buying Proves Too Cautious

Consuming Trades Miss Opportunities and Puzzle Spinners

THE twelve months of 1915 brought opportunities to yarn buyers such as have not been seen in any recent years, but the fact which disappointed spinners through the early part of that period and which disappointed buyers in the latter part is that these opportunities were allowed to pass without arousing the interest and the action that they justified. There have been only scattered spurts of buying from the home trade, and those chiefly in the last four months, while export buying, the year's most outstanding feature, has been the one redeeming factor which held supply down to a point where it did not completely overbalance demand. Sharp competition for trade, however, was in evidence most of the year, and there was much of the usual price-cutting by speculative short selling, sacrificing from stock or commission cutting. Buyers took advantage of this in many of their purchases, shopping through the market until they found a weak spot where subnormal levels were accepted. Most of the sales so made, however, were small, and the buyer let many opportunities go by to secure yarn at prices lower than had been quoted for years and 30 per cent. under the level that is at present quoted and in prospect for some time to come. The buyer's argument in every case was that he could operate ahead only where forward business in his own particular product justified it. It seems to be true that the yarn consuming trades did lack a healthy forward business during the first eight months of the year, and when their books finally began to take on a more normal appearance in September or October, yarns had already risen to levels that were justified but not particularly attractive. Thus, as a whole, the year appears divided into two periods: January to August, inclusive, when the trend was downward and the market depressed by irregular trade, and September to December, when sharp advances and better business came to light.

MARKET CATCHES MANY BUYERS

The abnormal depression in cotton led many buyers to take a strongly bearish attitude toward yarns, at least up to August, and the advance without doubt caught many of them on the short side, with part of their product sold and no yarn bought to cover. Even as raw cotton and yarns progressed toward the higher levels a number of buyers remained firm in the conviction that it was only a temporary flurry and, as a result, permitted the market to get away from them completely. Whether this experience will teach them the lesson that the yarn market will not always respond to bearish tactics is doubtful, though commission men wish that it would. From common gossip in the trade, knitters are the chief class of buyers who have let the market get away from them. Balbriggan manufacturers, particularly, are said to have figured on further declines when they opened their lines last June and July, and, as a result, sold their merchandise at lower prices than actual conditions warranted. They have never seen the yarn levels they expected, and now yarn is selling 6c. or more per pound higher than in July. Throughout the year raw cotton's fluctuations have been fairly closely followed by yarns. In January, with cotton at 8.00, framespun 10s cones were 14½c. and 20s two-ply skeins 15c. In March, with cotton at 8.50, 10s cones were 15c. and 20s two-ply skeins 16c. In May, with cotton at 9.80, 10s cones were 17c. and 20s two-ply skeins 18c. In July, with cotton at 9.20 10s cones were 15½c. and 20s two-ply skeins 17c. In September, with cotton at 11.30, 10s cones were 17c. and 20s two-ply skeins 19c. In early December, with cotton over 12c, 10s cones were 20c. and 20s two-ply skeins 22c. Cotton fluctuation not only changed the basis on which the spinner calculated, but also hastened or retarded buyers as they figured the market to be turning against or for them. Through the year these effects were largely sentimental, and the average buyer took his attitude more from what he hoped the market would do than from good, careful figuring.

TREND HAS BEEN UPWARD.

Just as 1914 showed an almost steady decline in yarn prices, 1915 has shown an advance. There have been only few periods of recession, and those brief, the market for the most part wavering uncertainly between weakness and strength. The greatest price increases also have been recorded in periods of comparatively short duration. As dealers have frequently described him, the spinner is prone to sudden enthusiasms. When things seem to be going his way, bullishness comes upon him over night and prices bound upward. There have been periods this fall when spinners' ideas of price rose 1 and 2 cents between telegrams on the same day. Because of this headlong rush for advances, spinners nearly always outstripped the distributing market, making a straight commission business hard to put through when dealers were selling yarns considerably below what mills were asking for them. Though spinners as a rule led the advances, dealers usually led in declines by their close watching of the market and speculative anticipation of its trends. When conditions began to warrant lower prices, many dealers would take business under the market on a short basis, trusting that they could later buy from the spinner at a figure that will show them profit. Many instances of market depression are due to this short selling. Spinners are beginning to follow the position of dealers on matters of this sort more closely than formerly and to assume a stiff attitude on prices when they feel that there is a large short interest on the market. Many of the upward flurries in 1915 were due primarily to commission house buying, rather than to direct activity of the consuming trades.

WEAVERS CAUTIOUS FOR MOST OF YEAR

The weaving trades banished their extreme caution only toward the close of the year. From January through August it was always in evidence, and even when dealers were cutting the last fraction off a market already abnormally depressed, weavers held out because they expected something still lower. This position was largely forced upon them by sluggish trade in their own products, for many yarn consumers were running only part time early

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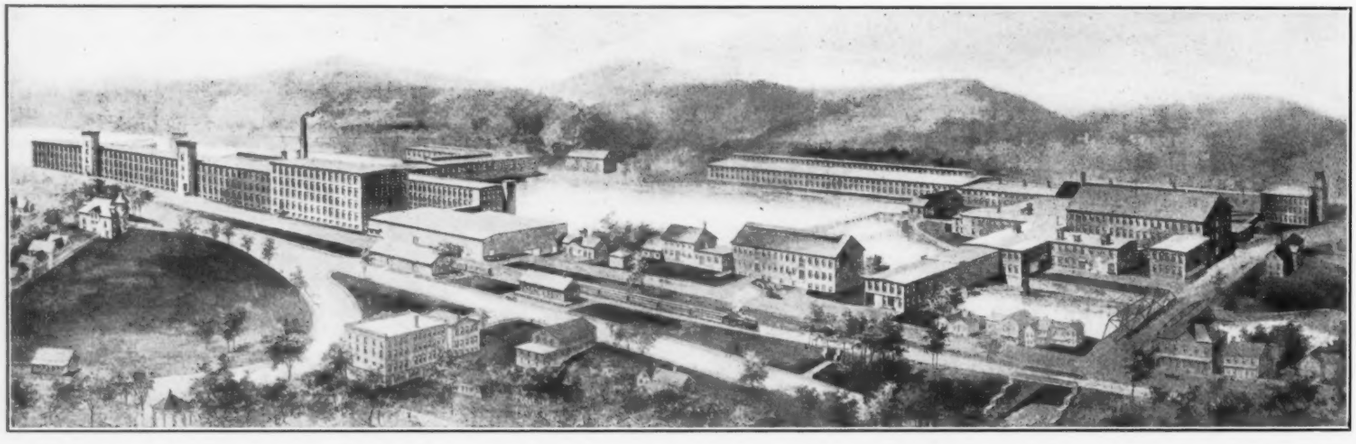

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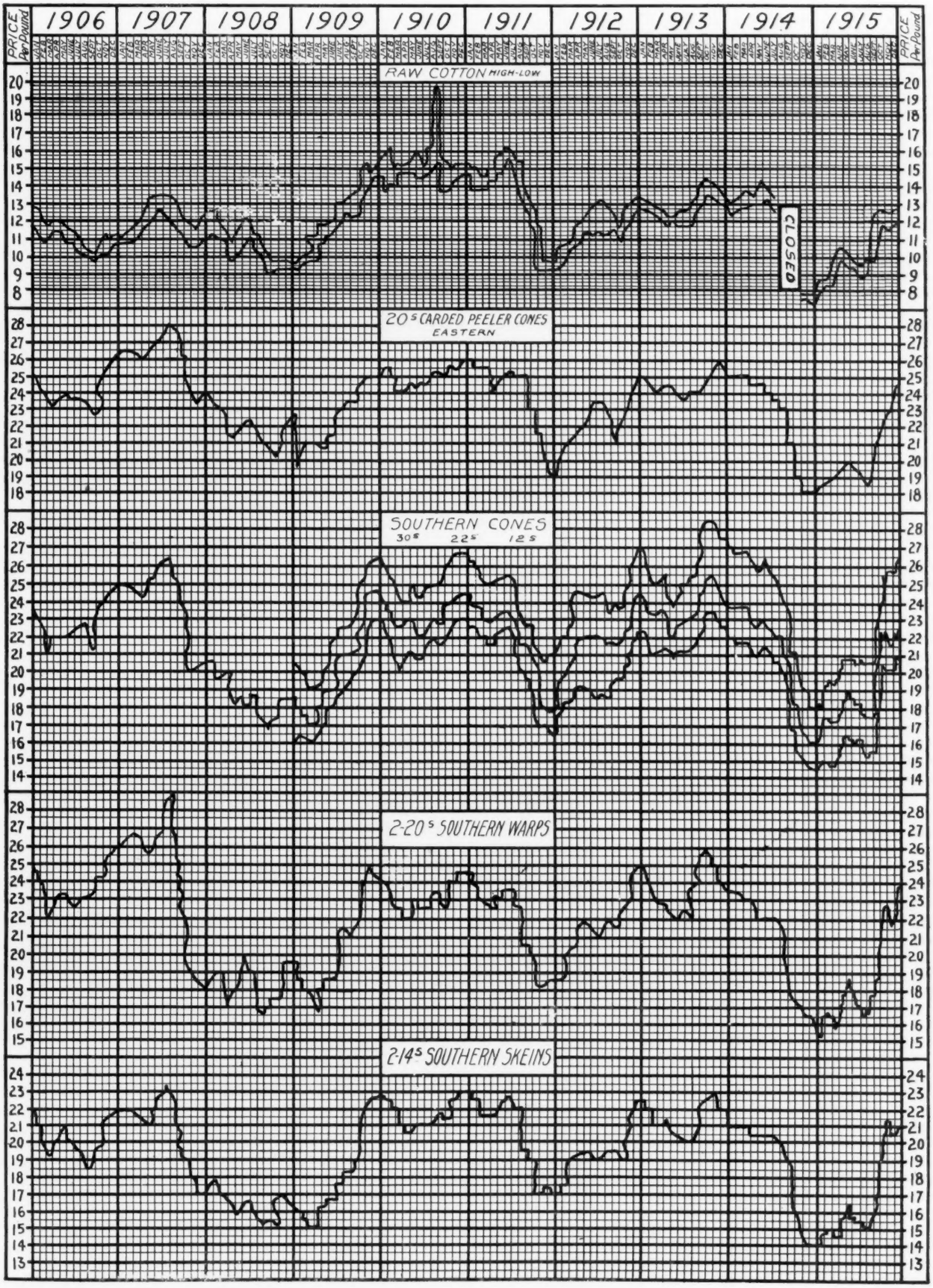

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n the year. Electric supply manufacturers were turning to other things than insulated wire; upholstery and carpet mills were curtailing, dress goods makers seemed to be getting along without cotton yarns; embroidery and lace trades were spotty, and towel and tape mills were doing only a fair trade. With the war in Europe and much uncertainty in this country's own foreign relations, securities of munitions companies appeared to be the only thing that it was at all safe to be long on, and it is certain that yarn even at ridiculously low figures inspired practically no buying of the sort which might be called "investment." Manufacturers took the short side, if they took any, and hand-to-mouth buying became the accepted and usual thing. On the advance in September fair buying for the year's last quarter came out, and with the advance in cotton there came to light unmistakable signs of commercial prosperity, which began to take hold of yarn consumers one by one. This continued to such an extent that by the end of November yarn contracts for six months ahead were being placed, and business was on a larger and healthier scale than had been seen for almost a year and a half.

YEAR CLOSES HOPEFULLY

Spinners who had been complaining of lack of orders last spring and summer found themselves at the close of the year with their books pretty generously filled for three months ahead and scattered orders running to June or beyond. A number of mills are reported actually sold up through March, and this is encouraging those who still have available production in that period to believe that they can successfully hold it for a good price. Through the year there has been the usual disparity here and there between various counts as demand and supply rose and fell. The standard descriptions are said to have been the market leaders at nearly all times. In the year's first half 20s and 30s were in large supply and lacked buoyancy. In September, however, rising demand for 20s and 30s two-ply warps made them both scarce, the latter in particular. Many spinners who were properly equipped increased their production of 30s, and in certain quarters there has been talk of overproduction, but no evidence of it. Single warps have been in less demand toward the year's close, and it is said that the towel trade is turning from these to two-ply yarns. Dark stock yarns have been plentiful because of the large proportion of poorly grown cotton this year, and coarse counts can nearly always be picked up in this dark stock at 2 to 2½c. under white. Fine carded yarns have been fairly steady, because the premium for good cotton has been high. Fine combed yarns developed through the year from a position of uncertainty to one marked by general demand, high prices, and well-sold mills for six or eight months.

KNITTERS HARD TO STIMULATE

Improvement in the yarn buying of the domestic knitting trade has been hard to stimulate during 1915. During the year's first half knitters were fair buyers, though they appeared so largely by comparison with weavers, who then were at a low ebb. During the fall, however, they were continually pressing for lower prices, and, failing to get them, they restricted their buying to nearby needs only. Dealers figure that many underwear mills were caught short on yarns; they had sold their product ahead and neglected to cover, so they have been buying in hand-to-mouth fashion, in the hope that some factor may swing the market in their favor before all their cheap goods are made up. On the other hand, there were knitters who had bought ahead last spring and still had contracts or stocks to supply them, and when the market began its advance they stayed out because covered ahead. As the year closed underwear mills were beginning to operate ahead, particularly those which require yarn of a particular quality, and inasmuch as underwear trade has been excellent of late, other mills, it is believed, will follow suit. The hosiery trade has spent a year of great uncertainty, involving irregularity in business placed and extraordinary difficulty in the securing of dyestuffs. A hosiery mill's yarn buying has in many cases been limited to the amount of yarn it could dye, and as this has been small and calculable only for the near future, operations in yarns have been on a hand-to-mouth basis. The lack of dyestuffs has curtailed yarn selling to many other trades than hosiery, and one dealer last fall said that his lost opportunities for business, because proper colors were not available, in one week totaled 300,000 pounds. In the sale of knitting yarns there is a trend toward finer counts for the greater yardage. Thus former users of 24s use 26s; of 26s, use 28s, etc. There has also been less than the usual parity between frame and mule spun yarns, with the former the leader in largest business.

EXPORTS OF UNUSUAL MAGNITUDE

Export demand for cotton yarn has sprung up from many sources during the year, and trade amounting to several million dollars has been put through. Inquiries have come from all sides, but the lion's share of actual business has been placed by South America in general and Argentina in particular. Inquiries for large lots have been noted from Holland, Italy, Switzerland, and smaller quantities from England and Canada, some of which have resulted in business. South American trade came in fairly steadily from March to September, when the advances gave it a temporary check. Late in November it reawakened, and several lots of 200,000 pounds each were contracted for. Shipments to Argentina alone from May to October, inclusive, amounted to nearly $1,000,000 in value, and from New York alone September shipments to that country were $292,160, and October $215,925. The great increases here are shown by the fact that yarn shipments from the entire country to Argentina in 1913 amounted to only $88,813, and in 1912 only $118,899. This South American business requires careful packing to conform to buyers' wishes. The most usual form is to have the yarn on cones, a certain number of cones wrapped together, and a certain number of these bundles put together in a bale. The bale must be small, weighing 100 to 125 pounds, and carefully wrapped inside the burlap with paper and some waterproof material. Bales of this character are frequently transported long distances inland by donkey, two to a donkey, one swung on each side. The yarns in demand are chiefly coarse counts, from 8s to 20s in singles mostly. Export demand at one time actively sought dyed yarns, but the trade was so unsatisfactory from both the sellers' and the buyers' point of view, because of the color shortage, that it fell into the background. Export business has entered the market through fairly well established channels, and many dealers who sought for it were unable to secure it. One important factor estimates that total buying has been about 25 per cent. larger in 1915 than in 1914, and a majority of this increase must be credited to export account.

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Mill Profits Unsatisfactory

Losses to be Recouped Before Shareholders Can Benefit

WHILE there have been substantial increases in the share values of many New England textile shares during the last six months they anticipate better earnings and larger dividends, instead of being based upon any marked improvement in present finances. The very few mills that cut dividend payments during the extreme depression of 1913-1914 and that have since resumed wholly or in part, together with the considerable number of mills still upon the non-dividend paying list, demonstrates in a convincing mnaner that a few months of prosperity are not sufficient to make good previous losses and shrinkage of surplus accounts. It is an open secret that many mills that maintained dividend rates during the depression made deep inroads upon their surplusses and they must rehabilitate the latter before larger dividends can be expected. What is more, they and many other mills not only failed to keep up their depreciation accounts, but refrained from all but the most pressing expenditures for betterments. Now they must use their first available earnings for the latter, and are facing the necessity of re-equipping, or of enlarging if they are to take full advantage of the apparently returning prosperity. Scarcity of labor, and increased competition for the same from industries engaged upon war orders, are factors that have forced an advance in wages that is unwarranted by conditions within the textile industry, and this 5 to 10 per cent. advance has been filched largely from the pockets of stockholders who have, in many instances, been getting reduced dividends, or no dividends, for several years.

LARGE SALES AND SMALL ADVANCES

Transactions in textile shares during the last four months have been larger than for any similar period in several years, and represent the direct antithesis of conditions ruling during the first half of the year when stocks were stagnant. The advances in share values, too, are narrow compared with the volume of sales, and tend to confirm the well-known fact that much of the early trading was between brokers and bankers who were trying to make a market for securities that had been accumulating for a long period. Advances from the low of the year have exceeded 25 points in but few instances and have averaged considerably lower; and this despite the fact that the lowpoint touched by textile shares during the final half of 1915 averaged as low as in 1914. It is true, and encouraging, that the advance has been very general and has included mills that are still upon the non-dividend-paying list, as well as those that are still upon a reduced basis. Of those mills that are in the former class, Chicopee has advanced 35 points, Hamilton Manufacturing 17¼ points and Merrimack 13 points. Of the latter class Arlington has advanced 25 points and Tremont and Suffolk 15 points. More significant is the stock advance history of some of these mills whose dividend rates were not reduced: Androscoggin, for instance, pays 10 per cent. annually and has risen only 24¾ points; Bates pays 12 per cent. and has gone up 28 points; Dwight pays 12 per cent. and is up only 35 points on $1,000 par value; Great Falls, a 12 per cent. stock, has advanced 21½ points; Pacific, an active 6 per cent. stock, is up 23 points, while York, paying the same, has risen only 9¾ points.

WOOL AND FINE COTTON MILLS IN BEST SHAPE

The fine count cotton goods mills were the first to feel the coming of better times, and they were closely followed by the wool mills, while now the sales-yarn mills making combed product are the leaders. Each of these groups had been most adversely affected by the lowered schedules of the Underwood tariff, and when the war checked imports of competing goods they were materially benefited. Only a few of the woolen mills were directly benefited by war orders, and these contracts ran out long ago. Now, all of these mills are participating to the largest degree in the improved domestic business, practically freed from foreign competition of a dangerous character. But most important for the future of trade with these mills is the fact that there has been no marked expansion in any of these classes of manufacture for seven or more years. The last boom in textile mill building was in 1909, and it was the worsted and fine-count cotton cloth and yarn mills that participated to the largest degree. Since then these branches of the industry have practically stood still, and in periods of maximum consuming demand it is certain that their capacity will be overtaxed. Whether that period is at hand, or must be delayed is yet to be proved, but it is certain that they are being pushed to the limit just at present, and that with stable political and business conditions assured another building boom would develop. As it is, a marked expansion has been started among combed cotton-yarn mills, particularly those making tire cloth and allied coarse yarns, and there is no question about the legitimacy of this expansion in its present scope.

Comparative Mill Quotations.

Mill	1915. High.	1915. Low.	1914. High.	1914. Low.
American Woolen pfd.	98	77⅛	82⅛	73⅝
Amoskeag com.	67	59⅛	65	58½
Amoskeag pfd.	101½	98	100	95
Androscoggin	160	135¼	137	135¼
Arlington	100	75	80	75¼
Bates	241¼	213¼	230¾	213¾
Bigelow-Hartford pfd.	107¾	103	...	...
Chicopee	95	60	61	57½
Dwight	1,035	1,000	1,035	1,020
Great Falls	192	170½	180	168
Hamilton Mfg.	77½	60¼	83	75
Hill	90¼	85	90¼	85
Jackson	985	890	890	700
Lancaster	92	60	92	75
Lyman	125⅝	112	120¾	112
Mass. Cotton	133¼	114	116	115½
Mass. in Ga.	100	93⅛	93⅞	93⅛
Merrimack	35	22	30¼	24½
Nashua	711½	650	672½	630
Naumkeag	222¼	*178¼	198¼	172
Pacific	125	102	112½	106
Pepperell	121	114	...	...
Pepperell (old stock)	346⅛	305	305¾	290
Tremont & Suffolk	112	97	102	100
York	95¼	85	85¼	85

* Ex-rights.

New Bedford's Successful Year

Average Dividend Rate of Cotton Mills for 1915 was 7.83 Per Cent

Compiled by Sanford & Kelley

SINCE the middle of the year 1915 there has been a steady improvement in the demand for fine textile cotton goods. Improved conditions were first noticed in the increased inquiry on the part of the jobbers for fancy novelties which was caused by the failure of supply from foreign quarters as a result of the war. It was months after before standard goods could be sold at a profit when made from cotton purchased at current prices. It was not until December that the price of staple fine goods reached a level that showed any margin of profit to the manufacturers. The fine cotton yarn mills of New Bedford had a much more prosperous year than the cloth mills. All the yarn mills enjoyed a good business throughout the year, and particularly during the second half. The tremendous increase in the production and use of automobile tires, which contain a large proportion of cotton yarn, was no small factor in the business of the local yarn mills. The fact that the National City Bank, of New York, has established many branches in South America to finance the undertakings of American merchants has caused a demand for American cotton yarns for these countries, and particularly Argentina. The exports of cotton yarns to that country during May, June and July, this year alone, amounted to ten times as much as during all 1914.

At the present time the cotton mills of New Bedford are running nearly to their full capacity and more spindles and looms are running and more hands are employed than ever before.

During 1916 it is expected that there will be a phenomenal expansion in the yarn and cloth markets, due to the fact that jobbers and merchants have no supplies on hand to speak of, having been following a hand-to-mouth process for two years; and now that money is easy their business can be so readily financed on low money rates, the commercial outlook for 1916 is exceedingly bright.

The outlook for New Bedford mill shares for the coming year is exceedingly bright, and there is every reason to expect they will continue the rise in prices which is now well under way. These shares increased during the year 1915 about $9,000,000 in selling value, but this in most instances has not brought the older mills back to prices at which they were selling in 1910.

It is expected in the coming year that many mills which have not been paying dividends for some time will commence disbursements to their stockholders. Among these might be mentioned the Booth Manufacturing Co., City Manufacturing Co., the Butler Mill on its common stock, the Nashawena Mill, Pierce Bros., Ltd., the Page and the Soule Mill. It is also reasonable to expect increased dividend rates or extra dividends from many of the New Bedford textile corporations such as the Dartmouth on its common stock, the Grinnell, the Holmes on its common stock, the Kilburn Mill, the Nonquitt, the Pierce, the Quissett on its common, the Taber and the Whitman.

One of the factors which is found to be helpful to all the textile mills in the United States is the continued employment of such a large force of men in the armies abroad, and the fact that so many of these will be incapacitated for active labor as a result of casualties. Then, too, in foreign countries after the war there will be such a scarcity of labor and such an inflation in the cur-

FINANCIAL STATEMENTS OF NEW BEDFORD COTTON MILLS.

	ASSETS.			LIABILITIES.				
Name of Corporation.	Land, Buildings and Machinery.	Merchandise.	Cash and Accts. Receivable.	Capital Stock and Bonds.	Bills and Accounts Payable.	Profit and Loss, Depre. & Reserves.	Surplus of Quick Assets.	Net Debt on Plant.
Acushnet Mills	$860,000	$535,496	$215,460	$1,000,000	.....	610,955	$750,956	.....
Beacon Mfg. Co., Com	615,929	480,449	*701,953	400,000	$559,834	438,497	622,568	.....
Beacon Mfg. Co., Pfd	.....	.....	.....	400,000	.....	.....	.....	.....
Booth Mfg. Co., Com	1,517,242	226,224	115,954	500,000	84,370	†40,051	.....	$242,192
Booth Mfg. Co., Pfd	.....	.....	.....	735,000	.....	.....	.....	.....
Booth Mfg. Co., Bonds	.....	.....	.....	500,000	.....	.....	.....	.....
Bristol Mfg. Co	1,232,026	495,485	140,028	1,000,000	568,282	299,258	67,230	.....
Butler Mill, Com	2,060,781	516,122	‡166,849	1,500,000	300,000	170,810	382,971	.....
Butler Mill, Pfd	.....	.....	.....	750,000	.....	.....	.....	.....
City Mfg. Co	900,000	383,085	105,292	750,000	534,915	103,462	.....	46,538
Dartmouth Mfg. Co., Com	3,116,847	882,962	a938,292	2,000,000	.....	1,434,366	917,519	.....
Dartmouth Mfg. Co., Pfd	.....	.....	.....	600,000	.....	.....	.....	.....
Dartmouth Mfg. Co., Bonds	.....	.....	.....	800,000	.....	.....	.....	.....
Gosnold Mill Co., Com	1,925,973	391,012	479,880	825,000	781,400	360,466	80,492	.....
Gosnold Mill Co., Pfd	.....	.....	.....	825,000	.....	.....	.....	.....
Grinnell Mfg. Co	1,500,000	403,853	436,313	1,500,000	143,203	696,963	696,963	.....
Hathaway Mfg. Co	715,863	426,636	344,158	800,000	.....	686,657	770,794	.....
Holmes Mfg. Co., Com	1,626,734	313,576	273,796	600,000	597,594	416,511	.....	10,222
Holmes Mfg. Co., Pfd	.....	.....	.....	600,000	.....	.....	.....	.....
Kilburn Mills	1,966,881	329,871	273,286	1,500,000	456,026	614,012	147,131	.....
Manomet Mills	2,850,000	1,356,809	256,842	2,000,000	1,409,923	1,054,619	204,619	.....
Nashawena Mills	3,897,278	695,123	523,568	3,000,000	1,612,048	413,901	.....	483,357
N. B. Cotton Mill Corp., Com	1,684,491	341,129	156,154	350,000	339,322	267,452	.....	317,039
N. B. Cotton Mill Corp., Pfd	.....	.....	.....	750,000	.....	.....	.....	.....
N. B. Cotton Mill Corp., Bonds	.....	.....	.....	475,000	.....	.....	.....	.....
Neild Mfg. Co	1,309,509	266,269	79,359	800,000	434,995	170,141	.....	339,367
Neild Mfg. Co., Bonds	.....	.....	.....	250,000	.....	.....	.....	.....
New Eng. Cotton Yarn Co., Com	8,755,945	1,875,027	b3,562,307	3,900,000	1,897,763	1,682,515	.....	1,173,429
New Eng. Cotton Yarn Co., Pfd	.....	.....	.....	2,000,000	.....	.....	.....	.....
New Eng. Cotton Yarn Co., Bonds	.....	.....	.....	4,713,000	.....	.....	.....	.....
Nonquitt Spinning Co	3,421,390	935,176	257,592	2,400,000	1,793,852	420,306	.....	601,084
Page Mfg. Co	1,067,766	725,782	c210,398	1,000,000	744,554	259,391	191,626	.....
Pierce Mfg. Co	600,000	1,003,721	291,566	600,000	351,213	944,073	944,073	.....
Pierce Bros. (Limited)	983,089	318,114	61,012	700,000	551,722	110,493	.....	172,596
Potomska Mills	1,110,221	265,495	585,647	1,200,000	7,042	754,321	844,100	.....
Quissett Mill, Com	2,142,406	439,000	165,701	1,250,000	533,245	539,422	.....	47,984
Quissett Mill, Pfd	.....	.....	.....	365,000	.....	.....	.....	.....
Quissett Mill, Bonds	.....	.....	.....	94,500	.....	.....	.....	.....
Sharp Mfg. Co., Com	1,747,195	718,377	219,179	900,000	946,319	329,132	.....	17,763
Sharp Mfg. Co., Pfd	.....	.....	.....	500,300	.....	.....	.....	.....
Soule Mill	1,699,936	356,896	99,997	1,260,000	652,217	244,611	.....	195,324
Taber Mill	1,678,807	315,445	81,426	1,300,000	485,429	290,050	.....	88,558
Wamsutta Mills	2,450,000	1,002,697	531,442	3,000,000	86,989	897,149	1,447,150	.....
Whitman Mills	2,929,741	517,602	d199,155	2,000,000	755,036	891,461	.....	38,279
N. B. Cordage Co., Com	326,521	274,323	263,095	200,000	.101	463,838	537,317	.....
N. B. Cordage Co., Pfd	.....	.....	.....	200,000	.....	.....	.....	.....

* Includes $5,900 insurance.
† Shows $43,949 profit and loss on asset side, and $84,000 reserve and $259,282 for renewal account.
‡ Includes $53,992 prepaid accounts.
a Includes $56,140 investments.
b Includes $709,173 for investments, $14,161 for suspense account.
c Includes $2,124 for insurance and interest.
d Includes $43,183 prepaid accounts.

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rencies of many of those countries that wages are likely to be exceedingly high. The high cost of labor in the United States as compared to other foreign countries has been one of the greatest disadvantages under which our manufacturers have worked for a good many years, so it is most encouraging to see the outlook for higher wages abroad.

The amount of cotton mills' bonds was reduced $25,500, the Quissett Mill having retired that amount, leaving but $94,500 outstanding.

The number of spindles increased, net, 4,656, the number now being 3,014,851. The number of looms is 53,733, showing but slight changes. The number of employes increased 300, to 32,120, about 17,650 males and about 14,470 females.

No new cotton mills were erected in 1915 though the following corporations made additions to their plants: Beacon Manufacturing Co. a new storehouse costing $100,000; Kilburn Mills, addition to plant costing $100,000; Dartmouth Manufacturing Co., addition to mill costing $70,000; Potomska Mills, addition to power plant costing $35,000; Rhoades Eyelet Co., addition to factory costing $10,000; Morse Twist Drill & Machine Co., addition to plant costing $10,000; Holmes Manufacturing Co., addition to plant costing $30,000; and the Hathaway Manufacturing Co., addition to plant costing $30,000. The Sharp Manufacturing Co. will erect and equip in the spring of 1916 a new factory near its present plant, the stockholders having voted to increase its capital stock, issuing $400,000 common and $600,000 preferred stock for the purpose. This issue will make the total capitalization $2,500,000, of which $1,360,000 will be common and $1,200,000 preferred. The mill when fully equipped will have 100,000 additional spindles, making a total of 200,000. The Merchants Terminal Co. erected a large warehouse costing $200,000.

New Bedford cotton manufacturing corporations paid during the year 1915 dividends aggregating $3,112,300.00, against $1,878,518.50, an increase of $1,233,781.50. The following corporations paid regular dividends: Acushnet, 8 per cent.; Beacon, 6 per cent. on common and preferred; Bristol, 1¼ per cent.; Butler preferred, 7 per cent.; Dartmouth common, 10 per cent., and on the preferred, 5 per cent.: Gosnold, on preferred, 6 per cent.; Grinnell, 54 per cent. on $1,000,000 and 3 per cent. on $1,500,000 and a stock dividend of 50 per cent. on $1,000,000; Hathaway, 10 per cent.; Holmes, on common and preferred, 6 per cent. on each; Kilburn, 6 per cent.; Manomet, 8 per cent.; Neild, 5½ per cent.; New Bedford Cotton Mills preferred, 6 per cent.; Pierce Manufacturing, 16 per cent.; Potomska Mills, 26 per cent.: Quissett common and preferred, 6 per cent. each; Sharp common, 4½ per cent. and on the preferred 6 per cent.; Taber, 6 per cent.; Wamsutta Mills, 6 per cent.; Whitman, 6 per cent.; and Nonquitt, 4½ per cent.

The following paid no dividends: Butler, on common; Booth, on common and preferred; City; Gosnold, on common; Nashwena; Page Mfg. Co.; Pierce Bros., Ltd.; and Soule Mill.

The corporations which increased their dividends in 1915 over those paid in 1914 follow: Bristol, from nothing to 1¼ per cent., in December; Grinnell, from 8 per cent. to 54 per cent. on $1,000,000 capital, besides paying a stock dividend of 50 per cent.; the extra cash dividend of $50 per share and the stock dividend of 50 per cent. were paid from the surplus earnings accumulated during a period of over 30 years, part of which had been expended in new plant and equipment. It has also paid 3 per cent. on the increased capital stock—Neild increased ½ of 1 per cent., going on a 6 per cent. basis. An initial dividend was paid on New Bedford Cotton Mills Co. common stock, the amount not being disclosed. The Sharp Manufacturing Co. paid an initial dividend of 4½ per cent. on common stock. Potomska Mills paid 6 per cent. regular and 20 per cent. extra, the first extra since incorporation.

It is expected the Nashawena Mill

NEW BEDFORD COTTON MILL DIVIDENDS.

Statement of New Bedford, Mass., leading corporations, showing dividends to shareholders in 1915 on capital invested as follows:

COTTON STOCKS.

Corporations.	Capital.	Dividend Dates.	Rate.	Amount.
Acushnet Mills	$1,000,000	Mar. 1, $2 quarterly,	8	$80,000.00
Beacon Mfg. Co., Com.	400,000	Feb. 15, $1.50 quarterly,	6	24,000.00
Beacon Mfg. Co., Pfd.	400,000	Feb. 15, $1.50 quarterly,	6	24,000.00
Booth Mfg. Co., Com	500,000	..	..	.....
Booth Mfg. Co., Pfd.	750,000	..	..	.....
Bristol Mfg. Co.	1,000,000	Dec. 1, $1.25,	1¼	12,500.00
Butler Mill	1,500,000	..	..	.....
Butler Mill Pfd	750,000	Mar. 15, $1.75 quarterly,	7	52,500.00
City Mfg. Co.	750,000	..	..	.....
Dartmouth Mfg. Corp., Com.	2,000,000	Mar. 1, $2.50 quarterly,	10	200,000.00
Dartmouth Mfg. Corp., Pfd.	600,000	Mar. 1, $1.25 quarterly,	5	30,000.00
Gosnold Mills, Co., Com.	825,000	..	..	.....
Gosnold Mills Co., Pfd.	825,000	May 1, $3 semi-annually,	6	49,500.00
Grinnell Mfg. Co.	1,500,000	Mar. 1, $2; June 1, $52; Sept. 1, $1.50; Dec. 1, $1.50.	107*	1,085,000.00
Hathaway Mfg. Co.	800,000	Mar. 1, $2.50 quarterly,	10	80,000.00
Holmes Mfg. Co., Com.	600,000	Feb. 15, $1.50 quarterly,	6	36,000.00
Holmes Mfg. Co., Pfd.	600,000	Feb. 15, $1.50 quarterly	6	36,000.00
Kilburn Mills	1,500,000	Jan. 1, $1.50 quarterly,	6	90,000.00
Manomet Mills	2,000,000	Feb. 2, $2; May 4, $2; Aug 3, $2; Nov. 2, $2,	8	160,000.00
Nashawena Mills	3,000,000	..	..	.....
Neild Mfg. Co.	800,000	Feb. 15, $1.25; May 15, $1.25; Aug. 14, $1.50; Nov. 15, $1.50,	5½	44,000.00
N. B. Cotton Mills Co., Com.	350,000	†	..	.....
N. B. Cotton Mills Co., Pfd.	750,000	Jan. 1, $1.50 quarterly,	6	45,000.00
Nonquitt Spinning Co.	2,400,000	May 4, $1.50; Aug. 3, $1.50; Nov. 2, $1.50,	4½	108,000.00
Page Mfg. Co.	1,000,000	..	..	.....
Pierce Mfg. Co.	600,000	Mar. 1, $4 quarterly,	16	96,000.00
Pierce Bros. (Limited)	700,000	..	..	.....
Potomska Mills	1,200,000	Jan. 15, $1.50 quarterly; Oct. 15, $20 extra,	26	$12,000.00
Quissett Mill, Com.	1,250,000	Feb. 15, $1.50 quarterly,	6	75,000.00
Quissett Mill, Pfd.	305,000	June 1, $3; Dec. 1, $3,	6	18,300.00
Sharp Mfg. Co., Com.	900,000	Aug. 15, $1.50; Nov. 22, $3,	4½	40,500.00
Sharp Mfg. Co., Pfd.	600,000	Jan. 22, $1.50 quarterly,	6	36,000.00
Soule Mill	1,260,000	..	..	.....
Taber Mill	1,300,000	Feb. 15, $1.50 quarterly,	6	78,000.00
Wamsutta Mills	3,000,000	Mar. 16, $1.50 quarterly,	6	180,000.00
Whitman Mills	2,000,000	Feb. 15, $1.50 quarterly,	6	120,000.00
	$39,725,000			$3,112,300.00

The dividends paid by New Bedford cotton manufacturing corporations in 1915 on $39,725,000 capital, amounted to.....	$3,112,300.00	7.83-100%
There was paid in 1914, on $39,225,000.....	1,878,518.50	4.76-100%
Increase	$1,233,781.50	65.67-100%

* $50 per share extra on $1,000,000 capital and $3 per share on $1,500,000; also a stock dividend of 50 per cent paid.

† Dividend declared but not announced.

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will begin paying dividends early in 1917.

The corporations which reduced their dividends in 1915 follow. Butler 1½ per cent.; City, 4 per cent.; Page, 3 per cent.

The average dividend rate paid in 1915 on the $39,725,000 capital stock of New Bedford cotton mills was 7.83 per cent.

In 1915 the dealings in the shares of local cotton manufacturing corporations were much greater than in 1914 and in several instances exceeded in volume those of any previous years. The swing of prices was upward instead of downward as has been the case in recent years, which was indeed pleasing to shareholders. The most active shares were those of the Quissett, Nashawena, Butler Pfd., Dartmouth Common, Taber, Holmes Common, Nonquitt, Potomska, Booth Pfd. and Grinnell. Transactions in the shares of some of the corporations amounted to thousands of shares. Prices bounded upward in a manner never before witnessed in this market, ranging all the way from an advance of $5 per share to $135 per share. The greatest activity and advance in prices was during the last half of the year. The feeling at the close of the year is buoyant and higher prices are anticipated in 1916. The changes follow: Acushnet advanced 15¼ to 175; Beacon preferred, 3 to 117; Booth preferred, 42 to 102; Bristol, 42 to 97; Butler common, 14½ to 82½; Butler preferred, 8 to 105; City Mfg. Corp., 27 to 105; Dartmouth common, 65 to 200; Dartmouth preferred, 4 to 103; Gosnold preferred, 10 to 95; Grinnell, 40 to 180, extra dividends on; Holmes common, 67½ to 175; Holmes preferred, 13 to 120; Kilburn, 30 to 140; Manomet, 16 to 130; Nashawena, 33 to 96; Neild, 19½ to 121; New Bedford Cotton Mill preferred, 8 to 100; Nonquitt Spinning, 22½ to 100; Page, 5 to 78; Pierce Mfg. Co., 135 to 425; Potomska Mills, 37½ to 150, extra dividend on, down to 119 and up to 135, ex. dividend; Quissett common, 37½ to 140; Quissett preferred, 14 to 118; Sharp common, 15⅝ to 105; Sharp preferred, 8½ to 107; Soule, 38 to 96; Taber, 22¾ to 120; Wamsutta, 8½ to 122½; Whitman, 45 to 165. Prices at the close of the year were not all at the highest, but the changes were only comparatively slight.

Strong Position of New Bedford Shares

Mills are Emerging from Period of Depression

WHILE every New Bedford mill has shared in the prosperity of the year, not all of them have got back again to a dividend-paying basis, but practically every one of the old corporations that had accumulated a surplus in past years, and was thus able to weather the recent depression, is now on a satisfactory dividend-paying basis, while the newer mills are fast reducing their debt charges and getting into strong financial position. A reflection of this has been shown in the local stock market where there has been an upward move in mill stocks which has been healthy and gradual and has increased the total value of stocks held by shareholders by millions of dollars. The extra dividends of the Grinnell and the Patomska (the former a dividend of $50 and the latter of $20) were paid out of accumulated earnings of many years past, but the fact that the managements of these mills, both highly conservative, should have declared these extra payments during the current year augurs well for the underlying strength and stability of the business at the present time, and for its immediate outlook.

MUCH UNPROFITABLE CAPITAL

In January, 1915, not over 75 per cent. of the fine goods machinery in New Bedford was in operation, and in some mills, where the ratio was even lower than this, the overhead charges, which were practically the same as at capacity business, were eating heavily into the manufacturing profits. In January, 1915, there was more than $20,000,000 of capital in New Bedford mills that was not producing dividends at all. During the last quarter of 1915 there was about $12,000,000 that was not producing, but as stated the greater part of this was in new corporations, or comparatively new ones, and while not producing dividends, was producing a revenue that was constantly cutting down debt charges.

THE YEAR'S DIVIDEND RECORD

During the year the mills of New Bedford have paid to stockholders in dividends the sum of $2,747,304.50. This is on a total capitalization of $43,565,000, making an average dividend rate for the entire investment in mills here of 5.25 per cent. for the year. This is on the total capitalization. The dividends were paid by 19 out of the 27 mills. The capitalization figures quoted are for all of the mills, dividend-paying and non-dividend paying. If only the dividend-paying mills were figured, the rate would be somewhat higher, but for a survey of the entire industry the total investment of all mills here is taken. The mills have disbursed in wages a larger sum this year than ever before in the history of the local business, inasmuch as wages were never lower than they are at the present time, and there are more spindles operated in New Bedford than ever before.

In the dividend total noted is figured the extra dividend of $50 per share paid by the Grinnell, and the extra dividend of $20 per share paid by the Potomska. These, of course, are purely extras paid out of a surplus, and earned only partially this year. This large extra distribution, in the case of the Grinnell amounting to $500,000, has materially swelled the total of the dividends, and should be deducted if the actual earnings of local mills during 1915 are to be calculated accurately.

By quarters the dividend disbursements have been as follows: first quarter, $407,129.50; second quarter, $1,068,525; third quarter, $462,625; fourth quarter, $509,025. Out of twenty-seven corporations in New Bedford at the present time, twelve passed dividends the first quarter; eleven passed dividends the second quarter; ten passed dividends the third quarter, and eight passed dividends the fourth quarter.

Whether the good business of the past year will persist during 1916 is a matter of conjecture, but if the present conditions obtain, manufacturers look forward to a good year. They are, however, extremely fearful of the tariff, many of them saying that the first ten months under the present bill showed that it did not give the fine goods industry anything like the protection which it needed for an ordinary manufacturing profit. And if the present abnormal conditions should suddenly cease to be, and there should come a reversion to ordinary conditions with the tariff operative, manufacturers here are almost unanimous in fearing that the industry will suffer depression. How serious that depression might be no manufacturer here is able to tell.

Fall River Yearly Figures

Corporations Show Conservation on Dividends—Surplus Increases

INDUSTRIALLY and financially the textile corporations of this city finished the year 1915 most satisfactorily, not so much on the record of achievement as for the propitious outlook. All indications, as they are measured by the practised eyes of old and experienced manufacturers, tend toward the conviction that this time twelve months hence it will be possible to present a review of a busy and prosperous period suggestive of the former halcyon days in the cotton business. Optimism is so strong that it has brought about a feeling of independence among producers of cottons which no wiseacre foresaw when the old year entered upon its career of uncertainty. The foundation thereof is the obvious improvement in the situation That it is going to last is the consensus of opinion, and mill men are preparing themselves accordingly. That idea was reflected in the reports at the annual meetings a few months ago, showing a large outlay for machinery in spite of the tactical need for the bestowal of attention upon the dividend wants of stockholders. Agents, with the concurrence of directors and in disregard of the likelihood of jaundiced utterances respecting their capability as managers, acted on the paraphrase: in time of comparative quiet prepare for activity.

DIVIDENDS REDUCED

When the dividend gauge is applied to the year's trading, it is made to show less advantageously than in 1914. There is a difference of $110,034 in totals. In 1914 stockholders shared $1,243,793; last year the distribution amounted to $1,133,759, representing less than half of the net earnings, calculated at $2,408,009. The corporations not sharing in the modified form of prosperity are: The Barnaby Manufacturing Co., which had a checkered career for several years as a producer of ginghams, and which, after several months of idle machinery, is going to be disposed of in some way in order to satisfy the demands of creditors, whether by reorganization or direct sale remains to be recommended by a committee; Arkwright Manufacturing Co.; Stafford Mills; Wampanoag Mills; Parker Mills; Hargraves Mills; Seaconnet Mills, and Barnard Manufacturing Co. It is looked upon as a very short list among 38 concerns.

SAGAMORE'S HEAVY SURPLUS

Both in percentage and aggregate of dividends the Sagamore easily cuts the best figure in the comparison. The reason is plain why it is so much in demand. It has paid out $120,000, or 1 per cent. on its capital; and the annual statement indicated net earnings of $263,635, with a plant appraised at $1,820,924. Borden paid 7½ per cent., or $75,000, from its earnings of $177,567; Cornell, $32,000; Troy, $24,000; Osborn, $37,500; Bourne, $60,000; Tecumseh, $45,000; Davis, $75,000; King Philip, $72,000; Chace, $72,000; Merchants, $48,000; Lincoln, $18,750; Stevens, $42,000; Union, $72,000; Luther, $31,500; Flint, $69,600; Mechanics, $30,000; Charlton, $16,000; Weetamoe, $12,500; Daveel, $37,500; Shove, $22,000; Pilgrim, $15,750; Narragansett, $16,000; American Linen, $8,000; Conanicut, $5,034; Ancona, $4,500; Pocasset, $5,250; Laurel Lake, $6,000. The Laurel Lake, Lincoln and American Linen have resumed payments on the November quarter.

Net earnings, beside those mentioned, have been figured as follows: Weetamoe, $9,294; Troy, $279,970; American Linen, $7,277; Osborn, $73,512; Laurel Lake, $6,587; Bourne, $215,710; Tecumseh, $105,001; Lincoln, $151,591; Arkwright, $13,488; Davis, $175,485; Stafford, $38,872; King Philip, $75,979; Narragansett, $24,789; Seaconnet, $80,982; Luther, $69,246; Chace, $108,714; Stevens, $166,016; Union, $150,500; Flint, $81,171; Charlton, $102,083; Mechanics, $50,782; Cornell, $21,927.

SURPLUSES REDUCED

To maintain their rates of dividends six corporations have had to reduce their surpluses to the amount of $197,682. A year ago the review showed $404,527. The concerns affected were the Border City for $73,842; Laurel Lake for $27,844; Mechanics for $4,367; Cornell, $17,226; Osborn, $67,467; Weetamoe, $6,936. Increases in reserves amount to $425,160, compared with $410,538 in 1914. Surpluses are reported by the following: Richard Borden, $422,901, increase of $4,564; Sagamore, $1,078,636, increase of $129,136; Cornell, $214,956; Mechanics, $289,139; Flint, $116,442, an increase of $11,571; Union, $455,995, increase of $78,500; Stevens, $200,282, increase of $88,361; Chace, $167,686, increase of $257; Merchants, $193,797, increase of $38,708; Border City, $136,694; Luther, $106,478, increase of $37,747; King Philip, $590,177, increase of $3,979; Granite, $109,001, increase of $90,001; Tecumseh, $209,221, increase of $13,570; Osborn, $97,847.

CORPORATE OBLIGATIONS

Obligations, as they appear in the statements of treasurers, total $3,958,946, divided among the following: Charlton, $167,846, decrease of $72,291; Barnard, $449,914, increase of $58,883; Seaconnet, $244,713, increase of $8,018; Hargraves, $293,329, increase of $66,130; Narragansett, $61,350, decrease of $6,378; Parker, $270,641, increase of $46,231; Wampanoag, $211,536, increase of $2,605; Granite, $218,218, increase of $10,538; Davis, $235,113, decrease of $60,481; Arkwright, $267,248, decrease of $9,257; Lincoln, $260,542, decrease of $106,829; Bourne, $29,966, decrease of $43,338; Barnaby, $358,354, increase of $77,070; Ancona, $201,509, increase of $37,509; American Linen, $169,692, increase of $15,504; Troy, $138,114, increase of $17,451; Pilgrim, $20,674; Shove, $70,191; and Pocasset, $34,772.

The decreases amount to $291,056, and the increases to $357,408, the Barnaby being responsible for the big difference. Last year the relative standing of increases to decreases was $282,304 of the one to $240,419 of the other.

The balance sheets show merchandise valued at $10,484,456; bills collectible, $3,837,974; bills payable, $11,633,141; profit and loss charges, $15,428,924; depreciation, $1,869,393; machinery and buildings, $35,636,214; bond issues amounting to $1,576,500, distributed among eight corporations.

The Swiss Cotton Famine

At the present time the textile industry of Switzerland stands confronted with a famine both in cotton and yarn—a circumstance which sufficiently indicates the critical position of affairs. Month by month the outlook has steadily darkened and things have now come to such a pass, that if the Swiss Import Trust cannot avert a national calamity, nothing else can. So exhausted are home stocks of Egyptian cotton that a number of mills will have to suspend operations, provided the embargo on the supplies still lying in Italy continues in force. For mills spinning American and Indian cotton the position is rather less tragic.

The Basis of Comparison

At the mere mention of the word "Speeder" the mill man's mind immediately flashes back "Woonsocket!" The thought is instinctive as the

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has for nearly forty years been the standard of comparison.

Consistent, faithful service under the most difficult conditions during that period has inspired in the minds of mill hands, overseers, superintendents and agents alike an absolute confidence in the Woonsocket Speeder.

And that the frame is entirely up to the minute is attested by the presence of the Chain Drive eliminating the Geared-Horsehead, the Ball Bearing Rolls, extremely light running frame, and may other patented features.

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Technical Section

Micro-Photography in Cotton Spinning

THE fact that the New Bedford Textile School and the Lowell Textile School are both equipping their testing laboratories with micro-photographic outfits for the classing and testing of raw cotton and other fibers will concentrate the attention of the trade upon the use made of such apparatus in cotton buying and spinning by Arthur R. Sharp, treasurer of the Sharp Manufacturing Company, New Bedford, Mass. He was the first manufacturer in this country to equip a laboratory for the classing, blending and test-

PULLS OF PEELER COTTONS MOUNTED ON VELVET COVERED BASE READY FOR MEASURING

ing of cotton, the result of which has been the introduction of many refinements in cotton buying as well as in manufacturing, the effect on the cotton fiber of each machine and process in the spinnning mill being checked by regular tests. While Mr. Sharp does not claim to have originated the use of micro-photography in cotton manufacturing, he has developed, in conjunction with James McDowell, cotton expert for both of his mills, several novel instruments and methods for cotton testing, and some foreign experts have expressed the belief that more practical use is being made of micro-photography by this organization than by the Fine Cotton Spinners and Doublers Association of England or by the Manchester Textile School, where the use of micro-photography antedated that by Mr. Sharp. It was the knowledge of the valuable practical results obtained through this system of testing that influenced the Lowell and New Bedford textile schools to add micro-photographic apparatus to their laboratories.

PURPOSE OF MICRO-PHOTOGRAPHY IN COTTON CLASSING

Micro-photography and other scientific methods of cotton testing utilized by the Sharp mills do not make expert service in cotton buying and manufacturing any less necessary, but supplement the latter with refined methods of checking and comparison. For instance, the expert cotton buyer can detect the presence of unripe, immature and dead cotton in samples, but it is absolutely impossible with the naked eye or ordinary microscopic investigation accurately to determine the comparative number of such fibers. Micro-photographs give this information and enable the cotton buyer to determine with approximate exactness the condition of the fibers in any given sample, and with this and other tests the diameter, length and breaking strength may also be readily determined. The records of such tests give comparative information of the utmost value to the cotton buyer.

When cotton must be rejected because of not coming up to sample the micro-photographs of the rejections become almost irrefutable evidence. Last season micro-photographic investigation caused the Sharp mills to refrain from buying cotton from certain parts of a Southern state, and this season from a whole state. They have been the cause of their making what is almost a fixed rule not to buy first pickings of any type of cotton, owing to the excess quantity of unripe and immature fibers almost invariably found in such cottons.

The idea that the highest priced and cleanest cotton is always the best has been absolutely refuted by repeated tests in the Sharp laboratory, and the classing and blending that has been developed approximates very closely to the best English practice. These tests have also proved conclusively that these thoroughly matured cottons, because of the presence of more dirt and leaf, require more careful handling in the preparatory processes of spinning, although allowing higher speeds and larger production in the later processes; this also conforms very closely to the best English practice. Of even greater importance is the use of micro-photography in detecing the causes of imperfect or disadvantageous results of machines and processes in picking, carding, combing and spinning. Damaged fibers are quickly detected in micro-photographs, and careful investigation soon locates the cause. Radical changes in the treatment of certain cottons in the picker room have been proved advisable by micro-photography, as have slight modifications in the carding process, both changes resulting in largely increased production and increased breaking strength of yarns. Numerous other practical uses of micro-photography, supplemented by the Sharp system of testing unspun fibers for breaking strength, might be given, but the cases mentioned should be sufficient to demonstrate the broad possibilities of such scientific testing.

TWO PRINCIPAL METHODS OF TESTING

As a preliminary to the blending and spinning of the cotton, and for the purpose of permanent record, two distinct methods of testing are employed: One, that ends with the micro-photograph, is for the purpose of determining characteristics of the fiber, including development and size; the other is for the purpose of determining the approximate breaking strength of any cotton, and is based upon the break of a test group of the exact number of fibers of this particular cotton that are required to form a cross section of a number 20s yarn. The first named tests determine whether it is advisable to use ceratin types of cotton, either straight or in blend, and the latter test determines whether the blend is approximately correct, or whether it can be cheapened or must be improved to give a desired break when spun. Only the records of final tests go to the permanent records and are kept for comparative use in future seasons. The Sharp laboratory has been in use for three years, and the comparative data that has been accumulated covers such a wide variety of standard types of cotton that it is not now necessary to make as many or as exhaustive tests as had to be made during the first two seasons. When standard types are now purchased that have been regularly used, it is simply necesary to make a few preliminary tests in order to determine how the cotton compares in average quality of fiber and breaking strength with that of previous seasons; if the comparison is quite close, only such additional tests are made as are required to serve as a check and record.

When a new type of cotton is purchased, or when experimenting to select a cotton or blend for a new purpose, the following is the usual procedure: The types when received are placed in a conditioning room suitably equipped to produce a standard moisture content of 8½ per cent. The cotton remains in the conditioning room for about 24 hours. It is then taken out, classed and 12 pulls of each sample are placed on blocks covered with black velveteen, on which the lengths are measured. Records having been made of these, the blocks carrying the pulls are placed in the conditioning rooms, where they usually remain overnight. The plan usually followed is to class one day and test the next. It may also be stated that standard types of cottons regularly purchased are always kept in the conditioning room, some of the latter having been on the shelves for three years without showing any bad effects, thus proving the even hygrometric condition of the room.

THE TEST FOR BREAKING STRENGTH

In the testing for breaking strength only two forms of apparatus are used: One is the fiber selector and the other is a modified form of the Baer single thread hydraulic tester, which has been rebuilt so as to be available for taking the breaking strength of a group of cotton fibers. As previously noted, the object of this test is to secure a comparative record of the break of the exact number of fibers of any type of cotton that is contained in a cross section of a 20s single yarn. The development of a template, or fiber selector, that could be relied upon always to select the required number of fibers from the pull of a given type is the result of years of experimenting. First, it was necessary to determine the size of a rectangular slot that would hold just the number of fibers of any given diameter found in a cross section of a number 20s yarn, and it was then necessary to have some means of accurately compressing the fibers into this slot. That the instru-

(*Continued on page 231*)

FIG. 1

FIG. 2

FIG. 1. SEA ISLAND COTTON SHOWING PERFECT TWIST OR SPIRAL

FIG. 2. MISSISSIPPI COTTON HAVING IRREGULAR TWIST; A POOR SPINNING COTTON

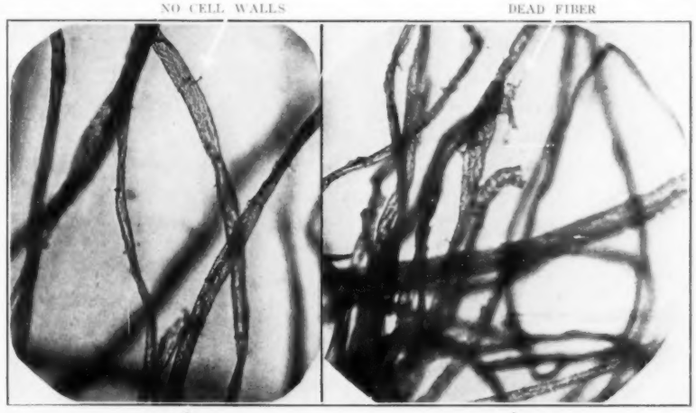


FIG. 3

FIG. 4

FIG. 3. MICRO-PHOTOGRAPH SHOWING UNRIPE FIBERS IN MIT AFIFI COTTON

FIG. 4. MICRO-PHOTOGRAPH SHOWING DEAD FIBERS IN EGYPTIAN COTTON

Combined Color and Weave Effects

By Thomas Woodhouse

THE ornamentation of textile fabrics by means of colored yarns and comparatively simple weaves is of general application, and the same or very similar decoration appears not only in cotton fabrics, but in those made entirely from wool, worsted, silk, linen, jute and ramie, as well as in combinations of two or more of these fibers or yarns in the same fabric. There are certain numerous well-defined styles which are applied more particularly to fabrics made of one fiber or yarn than to those made from the other varieties of yarn, but for the most part the various color schemes are suitable for all, although the resulting textures in the different materials may be used for entirely different purposes.

In a general way, and independent of the difference in weave, and also of all

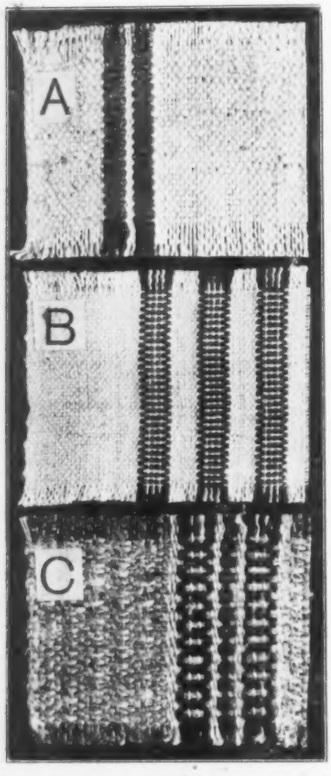


FIG. 1

systems of printing, these fabrics may be classified as follows:

1. Those in which the effect is due to colored warp yarns.
2. Those in which the effect is due to colored filling yarns.
3. Those in which the effect is due to colored yarns in both directions.

The character of the ornamentation may, however, differ entirely in these groups. For example, in the simplest cases, the colored threads are arranged to form almost continuous stripes, the continuity of the stripes being broken only by the picks of filling which are of a different color from those of the striped warp threads. The two sets of different colored yarns cross each other at intervals which depend entirely upon the weave and the number of picks of filling per inch. Thus, in a striped fabric it is evident that the color effect of either a broad or a narrow band of colored warp threads can be modified greatly by the relative number of picks per inch, but more particularly by the number of successive picks over and under which each colored thread floats.

On the other hand, it is quite possible to eliminate entirely this intermittent appearance of a different colored filling pick, and to produce a perfectly continuous broad or narrow stripe of solid color. To do this, however, it is necessary to resort to more complicated weaves which produce compound fabrics, or to arrange the reeding so that the warp threads in this particular col-

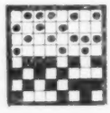


FIG. 2

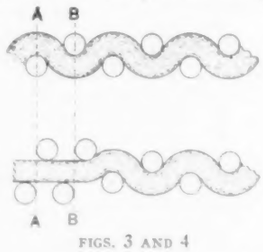
ored part shall lie so closely together that the picks of filling are effectively hidden from sight. The latter method is much the simpler, and is much more often adopted than the complicated weave system, not only because of its simplicity, but also because the effect may be obtained in the ordinary looms at a minimum of cost, and with comparatively little addition in the weight of the fabric over that of a simple self-colored cloth.

EFFECTS BY CRAMMING REED

It must be remembered, however, that the structure of the cloth at this stripe part, or stripe parts if there are two or more, is of an entirely different kind from that of the remainder of the cloth. It is indeed a compound structure, although it may be obtained by means of the simplest weaves. Consider for example, a perfectly plain cloth decorated by two of these solid colored stripes, as shown at A in Fig. 1. Although this pattern is by no means of the best quality, the white filling is almost perfectly hidden under the warp threads which form the two solid red stripes. All the stripe threads, including those in the narrow white stripe, are cotton. The remainder of the warp, as well as all the filling, is linen.

The cloth illustrated at B, the warp of which is all cotton, is also perfectly plain in all parts, so far as the weave is concerned, but the border differs essentially from that in pattern A. The border in pattern B is intended to represent what is known as a chain border, in which the two outside sets of red threads and the inner set of blue threads form the links, while the alternate white threads in these three groups, in conjunction with the white filling, form the centers of the links and the gaps between them.

The link or chain effect is more pronounced when the threads float over two or more picks of filling. This is demonstrated in pattern C where all the colored border threads, as well as the white threads, float over two and under two alternately. The ground work of this cloth is, however, not plain, but interweaves with the filling as illustrated in the small design in Fig. 2. Two complete units in the way of the filling are



FIGS. 3 AND 4

shown. The colored and white threads in the complete border illustrated at C in Fig. 1 are drawn on the harnesses which carry the third and seventh threads in the design in Fig. 2.

It will be seen that, since 6 threads of this design of 8 threads are plain, only 4 harnesses are required. Precisely the same pronounced border as that illustrated in pattern C could be displayed on the plain cloths of patterns A and B, provided that the colored threads were drawn on two special harnesses and controlled by two blades of an ordinary 2 up 2 down tappet.

All the stripes in these three patterns, A, B and C, are obtained by "cramming" the reed, but in all cases the structure of the cloth at these parts differs essentially from the structure of the cloths in the remaining portions. Moreover, practically all the ornamentation is due to the effect of the warp threads. This is quite evident in pattern A, but in patterns B and C it has been shown that the white filling helps to form the centers of the links.

We might with advantage consider the structure of the cloth illustrated at A in Fig. 1, since the colored threads in this pattern are drawn singly through

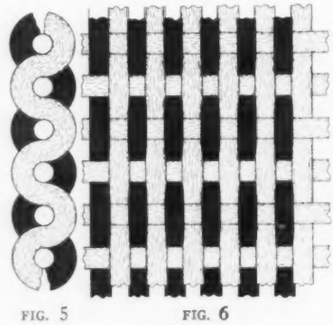


FIG. 5 FIG. 6

the harness. The threads and picks in the body of this fabric are not so closely packed as they could be, but this condition is assumed in the illustration in Fig. 3. By closely packed we desire to indicate that state in which both warp and filling show equally on both sides of the cloth. Such cloths are often termed "perfectly balanced cloths," and it is assumed that both sets band equally. Fig. 3 then illustrates a section through the threads in the ground or white portion of pattern A, Fig. 1. On the other hand, Fig. 4 illustrates a section through part of the red stripe and part of the white ground. In this latter illustration the first four threads on the left are supposed to be at the edge of the red stripe, while the next four threads adjoin the red ones and are therefore at the beginning of the white ground. The two dotted lines, AA and BB, show clearly that the first four threads in Fig. 4 occupy the same space as the first two threads in Fig. 3. In other words, the first four threads in Fig. 4 and all similar threads which form the solid red stripe in pattern A, Fig. 1, are "crammed" in the reed. It is a usual plan to put four threads per split in the crammed part when there are two threads per split in the ordinary part of the cloth.

The very fact of doubling the number of threads in the stripe parts alters the structure as illustrated. But even as the illustration appears in Fig 4, it is evident that on both sides of the cloth the fiilling can be plainly seen between the warp threads. In Figs. 5 and 6 a section through six picks of the crammed stripe is given and a plan of these six picks interweaving with 12 threads, the odd threads are shown in solid black for the sake of distinction. Figs. 7 and 8 show similar views of the ground part, that is, Fig. 7 shows a section through six picks of filling, while Fig. 8 is a plan of the same six picks interweaving with six warp threads.

It is obvious that if one considers the yarns as if they retained their circular form there is a considerable difference in the structure of the two parts of the cloth, although both are perfectly plain so far as the weave is concerned. Thus, from Figs. 3 and 7 it is clear that the warp and filling threads are bent equally; but on the other hand, Figs. 4 and 5 demonstrate that the filling is approximately straight, and that the warp threads bend much more than those warp threads in the body of the fabric. Again, while Figs. 3 and 7 show that both warp and filling help to form both surfaces of the cloth, that is, both sets appear in the upper and lower horizontal planes of the fabric, Figs. 4 and 5 show that the similar upper and lower horizontal surfaces of the cloth are formed solely by the warp threads.

Figs. 3 and 7 emphasize the fact that the thickness of the white or ground portion of the fabric is made up at all points of one thread of warp and one pick of filling, and hence the cloth may be termed a 2-layer fabric. The right hand part of Fig. 4 shows also that this portion is a 2-layer fabric, but the left hand part of Fig. 4 and particularly Fig. 5 proves that the thickness of the cloth at this point is made up of two warp threads and one filling pick. From similar reasons, the structure of the cloth at this part is of the 3-layer type. It is this alteration of structure which makes it possible to produce an absolutely solid colored stripe even in plain cloth, or rather in a cloth which is woven with the 1 up 1 down plain weave. In the illustrations given the warp and the filling threads are drawn the same diameter, but in the actual cloth the colored cotton threads are smaller, and hence the difficulty of weaving is minimized when both white and colored threads, ground and stripe, are woven from the same warp beam.

The uniformity of thickness in the warp and filling threads is exemplified in Fig. 8, and this figure shows conclusively that under the conditions illustrated, it would be impossible to prevent the formation of pinholes or interstices between the threads and picks. Now, it is well known that few, if any,

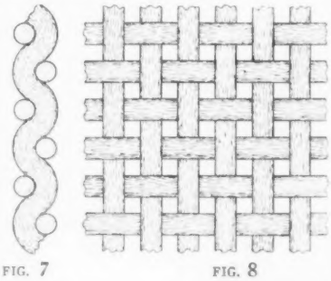


FIG. 7 FIG. 8

of the ordinary plain cloths exhibit this fault, and very few plain cloths are made so closely as that represented by the illustrations in Figs. 3 and 7. If the threads and picks were incompressible, or nearly so, as in the case of fine wire, the resulting plan of a plain cloth would be very similar to that illustrated in Fig. 8.

The actual thickness of ordinary plain cloths is, however, not equal to that illustrated in Figs. 3 and 7. Both threads and picks become compressed, partly due to the tension imparted during the weaving process, and partly due to the tension and pressure which the cloth undergoes during the operation of finishing, and thus the interstices are wholly or almost wholly closed by the expansion in two directions of every thread and every pick. The expansion of the threads in a slight degree is indicated in Fig. 6, but it is obvious that the filling still shows plainly, and that the threads must approach each other con-

(*Continued on page 234*)

Scarcity of Foreign and Development of Domestic Dyestuffs

Problem of Dyestuff Supply

By a Recognized Authority

ALMOST coincident with the beginning of the war the problem of a sufficient supply of dyestuffs for use in the textile industry became apparent. The practical monopoly of Germany in the coal tar color industry, while known to those who were especially and vitally connected with the distribution of this class of dyes, was not fully appreciated until the outbreak of the conflagration abroad which put a stop to the shipment of merchandise to this country and to the trade that had been developed in connection with the textile industry. Immediately upon the outbreak of the war the German Government placed an embargo on the exportation of coal tar dyes. The situation in the United States at that time was that the importers had 3 to 4 months' supply on hand in this country and had no assurance of any sort or description that further quantities would be forthcoming. Some plan had therefore to be worked out and put in operation before the supply in the United States was exhausted. There were two things to be accomplished: the German Government had to be persuaded to release the dyestuffs, notwithstanding her embargo and the British Government had to be persuaded to give safe conduct to the shipments.

A satisfactory conclusion was reached both with the German and British Governments on these two points. Germany released certain cargoes and Great Britain passed the shipments in accordance with the understanding. One of the conditions imposed by the German Government in granting the release was that the goods would have to be shipped in American bottoms and a bond would have to be given against re-exporting. These matters having been arranged to the satisfaction of all concerned, a steamer was chartered in New York, the "Matanzas," which sailed in ballast in October, 1914, and returned with a cargo of coal tar dyestuffs. The "Matanzas" made two trips and other cargoes followed on the "Sun" and "Warren."

DYESTUFFS AND COTTON BARTER

One may, perhaps, venture the inquiry as to why the German Government consented in October, 1914, to the release of the shipment of these coal tar dyes in the face of the embargo put upon them three months before. The answer is that cotton manufacturers in Germany had plenty of dyestuffs, but needed cotton, whereas the cotton manufacturers in the United States had plenty of cotton and needed dyestuffs. Up to that time no cotton had been shipped from the United States to Germany since the outbreak of the war. It seemed, therefore, that in the spirit of reciprocity, and considering the fact that at that time neither of these articles was on the contraband list, an exchange of commodities should be effected. At that time no guarantee could be given by anyone that cotton could or would be shipped, but assurances were given that a serious effort would be made to this end. The result of it was that cotton went forward at first in a small way, beginning with one or two cargoes, and later on in a large way. Cargoes of cotton in much larger volume and of a far greater aggregate value were sent to Germany than the amount of dyestuffs shipped from the latter country to America; expressed in dollars and cents, possibly in the ratio of 15 to 1, or, in other words, Germany probably received 75 per cent. of a normal annual consumption of cotton, and released a very much smaller percentage of its annual export of coal tar dyes to the United States, the shipments of cotton continuing for some time after the shipments of dyestuffs ceased.

Subsequently Great Britain issued the so-called Order in Council. Another application was made to Great Britain for "safe conduct" under the changed conditions for two more cargoes for shipment from Holland, which, had the release been obtainable from Germany, would have come forward several months previous; Great Britain gave assurance of safe conduct but these shipments have never been made as the German Government never consented o the release of the goods.

In an effort to bring pressure to bear on Great Britain to compel the latter's permission for cargoes of American cotton to be sent to Germany, it was urged in certain quarters that an embargo be placed on the shipment of munitions to the Allies. This proposition, however, was abandoned when it was shown how absurd the whole idea was.

IMPORTING PLAN PROPOSED

This impassé inspired certain manufacturing as well as importing interests to develop a plan by which it was hoped Germany would allow the shipment of dyes to America. Arrangements were made first with the Secretary of Commerce, Mr. Redfield, to receive cargoes of dyes consigned to him and then a corporation was organized, which should take upon itself the responsibility of distributing these dyes to consumers in this country. It was hoped that by this method it would be possible to guarantee absolutely that no dyes received here would find their way into Allied countries. When the matter was taken up with the German manufacturers, however, it was found that they were unwilling to permit interests other than the ordinary distributors of their merchandise in this country to superintend the marketing of their product. There was an absolute refusal to accede to the plan and the attempt was abandoned. The corporation, under which it was hoped that this distribution would be made, was the American Dyestuffs Consumers Corporation and was largely composed of textile interests, mostly manufacturers. During the last two or three months another attempt along similar lines has been made, this time by importers themselves, who, realizing the possibilities of the American market have endeavored to persuade their principals to allow shipments to come to this country. So far no definite developments have been announced, although it is claimed that England still stands ready to permit the free passage of dyestuffs to this country from Rotterdam. This company is known as the Republic Trading Corporation and is said to be developing plans for the resumption of trading between Germany and this country.

EFFECT OF DYE SCARCITY

The effect of the shortage of the dyestuff supply on the textile industry has become more and more appreciable as stocks have dwindled and prices have risen. For a long time the buyer viewed askance statements of the manufacturer concerning his inability to secure dyestuffs and the necessity of naming higher prices. It was argued that talk of scarcity was the result of efforts to secure inordinate margins of profit that were not based on actual conditions. It was not until lines in which fast colors were largely used were withdrawn from the market or delivery indefinitely postponed that the buyer awoke to a realizing sense of the situation confronting domestic manufacturers. During the last three or four months every week has witnessed increasing evidence of the acuteness of the situation in all lines of textile fabrics. One of the factors which postponed a general acceptance of the status, as it existed, was the publicity given through official sources to attempts made by various agents in this country to supply the deficiency in fast colors. These reports, issued almost daily, were the result of an investigation made by an agent of the Government—Dr. Norton—who reported from week to week the organization of new companies, the discovery of new methods of manufacture and new dyeing materials which, had they all materialized, as it was prophesied they would, could have supplied the manufacturers of this country with a sufficient quantity of coloring material to last them for an indefinite period.

DEVELOPMENT OF DOMESTIC PRODUCTS

There is no doubt that very material and important developments have taken place in the production of dyestuffs in this country, and it is also very evident that the increase in the building up of a domestic dyestuff industry is bound to be more and more apparent as the months go on. It is far from the purpose of this article to deprecate in any way the attempts which have been made and will be made to supply the deficiency produced by the stoppage of German shipments of dyes to this country. At the same time, however, in the light of events it seems to-day as though decided damage had been done to domestic manufacturing interests by the ill-advised publicity and misinformation, disseminated through official sources, of enterprises, many of which had little basis in fact and of discoveries that were so apparently fictitious to those who had any knowledge of the industry, but which to the layman afforded sufficient ground for argument, that the cry of a dyestuff famine was without basis in fact. There is to-day no necessity on the part of selling agents or of manufacturers to argue concerning the possibilities of the future and the problems with which they are confronted. The buyer is only too well aware of the difficulties he has experienced and will inevitably experience for some time to come.

ADVANCES IN PRICE

Naturally, as supplies became depleted prices commenced to advance. This tendency has been uninterrupted for months, and the stories that are reported concerning the abnormal quotations named on lines of coloring matters that are essential for use in the textile industry seem almost incomprehensible. Naturally, also, consumers who have been obliged to pay these abnormal figures have felt that their interests have not been protected, and in numerous instances have charged their regular dealers with uncommercial practices, alleging an effort to secure profits that were entirely out of line with actual conditions. They have even gone so far as to claim that importers in instances have used intermediaries, such as brokers, and speculators, as repositories for supplies that they in reality owned, but on which they did not dare to ask the advance that was demanded by these second hands. It is not the purpose of the writer to decide as to the validity of these charges, but from a certain amount of experience he believes it is possible to say without fear of contradiction that whereas in a slight number of instances first hands may possibly have had a guilty complicity with distributors in an effort to obtain enhanced profits, a great majority of the trade have dealt with absolute fairness to their customers from the beginning. Instances are well known of prominent concerns engaged in the importation of German dyes which have continued to supply their customers at original contract prices, although it might have been very easy to suspend deliveries on the ground that no further merchandise was on hand or to obtain decidedly higher prices on the ground of increased cost of original shipments. To such concerns a great deal of credit is due for the attitude adopted, and though naturally criticism arises in connection with the distribution of merchandise, the original sources of which are curtailed, many manufacturers have little to complain of in the treatment which they have received.

WHY THE GERMAN MONOPOLY?

Much has been written as to the reason for the status of Germany in its relation to the manufacture of dyestuffs, but after all is said and done, there seems to be one controlling factor which explains the monopoly which the Germans have secured in this trade and the difficulty to be experienced by this country in attempting to build up an industry that will compete permanently with that abroad. It is true that long experience, cheap and skilled labor and the inherent quality of dogged investigation until definite ends are accomplished all have their place in the establishment of the industry as developed by the Germans, but over and above these considerations is the fact that the German dyestuff industry is essentially an interlocking industry. By this term is meant an industry in which certain of the products that are not essential to the main development of the merchandise produced can be disposed of to other divisions of manufacturing with the result that the overhead is reduced to a minimum. To be more explicit, as developed in Germany to-day the by-products of dyestuff works are sold to pharmaceutical and chemical factories and vice versa. This makes possible the production of dyes on a basis of minimum cost and with a minimum of waste. To compete with such efficiency and to establish a self-contained industry in this country would mean the organization of a varied number of industrial plants, the capital for the organization of which and also for their maintenance would be enormous. With all these handicaps a self-contained industry might be established were it possible to assure capital of permanent re-

The Bayer Company, Inc.

New York City.

Boston Providence Philadelphia Chicago Toronto

Works at Rensselaer, N. Y.

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Western Representatives, United Indigo & Chemical Co., Ltd., 218 W. Kinzie St., Chicago.

All Sulphonated and Saponified Castor Oils

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Senegaline

COLORS, GUMS AND MORDANTS FOR FABRIC PRINTING

BENSAPOL FOR SCOURING

turns. If, however, after the war is over the infant industries thus established were to be confronted with competition such as was experienced during recent years, not only in the matter of cheap labor, but also because of the ability or willingness to sell at a loss in certain sections of the industry in order to suppress any developing competiton, the attraction of money to develop such an industry is a difficult undertaking. For this reason every effort is being made to obtain assistance from Congress in the matter of legislation, both in regard to future tariffs and the dumping practice. Bills have been introduced at the present session of Congress and hearings are even at the present being held to persuade Congressmen that prompt action is necessary if future independence of German source of supply is to be secured.

The consuming industries are not likely to oppose the imposition of a protective tariff on any coal tar dyestuffs that either are or can be economically and successfully manufactured in this country; on the other hand, it is hardly reasonable to assume that consumers, and particularly the textile industry, would welcome a tariff on any dyes that are not, or for any reason cannot, be manufactured in the United States.

Consumers have repeatedly protested against the placing of a duty on various products, the production of which was quite impossible under basic conditions existing at that time. These conditions have undoubtedly changed to a certain extent in the United States since the outbreak of the war—for example, in the large increase in the number of by-product coke ovens with a resulting substantial increase in the output of benzol, toluol, etc. The question to-day is what products can now be made in the United States; these are entitled to a protective tariff.

Further Report on American Dyestuffs

By Dr. Thomas H. Norton

COMMERCIAL AGENT THOMAS H. NORTON, of the Department of Commerce, has completed a further report on the domestic dyestuff situation which has just been released for publication. This report gives a list of reported American producers of crudes, intermediates and finished dyes. It follows in part:

On Feb. 20 of this year, pursuant to a resolution of the Senate, a full report on every phase of the dyestuff situation was placed in the hands of the Secretary of Commerce. Attention was forcibly drawn to the serious risks involved in so complete a national dependence upon foreign sources for a class of products vitally essential to the very existence of our textile and many allied interests.

On May 1 the author was instructed to study carefully existing conditions in the dyestuff industry. Visits were paid to all companies engaged in the manufacture of coal-tar derivatives, including several newly organized undertakings. An exhaustive report on this subject appeared in Commerce Reports No. 115, for May 17, 1915. In the concluding paragraphs of this report it was shown that the available stock of dyes of German origin would probably be exhausted before the close of the summer. Strong emphasis was laid upon the imperative necessity of making timely provision for such a blow to the country's textile and allied industries. The prompt use on an extended scale of natural and mineral dyes was urged, and the pressing need of economy in the employment of coloring materials was fully demonstrated.

THE PRESENT SITUATION

As a matter of fact, the warning was heeded. Every possible device was called into play to reduce the quantity of dyestuffs used. The average textile mill husbanded its stock of colors so as to make it reach until about October 1. Since then the shortage has been increasingly felt. One mill after another has been forced to close entirely or in part.

A single instance is typical. The largest full-fashioned hosiery mill in the United States (and in the world) employs 2,500 operatives. Ordinarily it requires 500 pounds of dyestuffs daily to cover the needs of its dyehouse. On October 1 its stock of colors had sunk to half a barrel. Some 160,000 dozen pairs of hose were stacked up awaiting dyes. Over 1,000 operatives were enjoying an unwelcome vacation. With considerable difficulty the manager had secured a ton of aniline oil, to use for aniline black, at a cost per pound of $1.50. (The price in July, 1914, was 10 cents.)

The files of the correspondence of this Bureau show that similar conditions exist in all the branches of industry depending upon the factor of color. In every sense of the word American textile and allied interests are facing an acute "dyestuff famine." The occasional arrival of small lots of Swiss colors, or of other artificial colors, secured by various means in out-of-the-way corners of the world, serves only to accentuate the seriousness of the situation. South America and the Far East have been searched for this purpose with exceptional diligence.

The question naturally arises in every quarter, "What has the Government done to alleviate the hardships of such a famine, and what is it now doing?"

The reply may be briefly formulated. Two departments of the Government only come into consideration in this connection.

The Department of State, for eight months, has exerted every possible effort to secure the free passage of German dyestuffs to our ports. Although, thus far, no results have been obtained, it continues its efforts without relaxation.

The Department of Commerce published in March, 1915, its exhaustive study of the dyestuff situation in the United States, outlining all the factors in the case. In May, it warned all industries concerned of the impending dangers. Since last February it has done all in its power to inform consumers of colors how they can most easily lessen the hardships incident to a shortage in dyes. It has inculcated economy in the use of dyestuffs generally. It has pointed out the desirability of employing natural coloring materials on the most generous scale. It has encouraged and stimulated every undertaking promising to add even the smallest amount to the available supply of dyes. It has done all in its power to prevail upon capital and enterprise to enter the field of coal-tar chemistry, to increase the supply of coal-tar "crudes," to multiply the production of intermediates, to broaden and intensify the output of American-made, finished dyestuffs. It has brought together inventors and capitalists, the producer of colors and the consumer of colors.

It has recognized the fact that all industries dependent upon the factor of color must suffer more or less from the existing conditions, and has urged a mutual spirit of conciliation and compromise between the consumers of colored fabrics and articles and the manufacturers of these wares.

ATTITUDE OF THE GOVERNMENT

With each added month of the current year it has become increasingly evident that American capital and American enterprise are ready to join in creating a national dyestuff industry, should they be assured of adequate protection against unfair competition on the part of foreign rivals when normal international exchanges are re-established. The needs of the case were carefully studied by the Federal Trade Commission and by the Department of Commerce.

It is now confidently hoped that American enterprise in the field of synthetic colors will soon be amply protected by a statute making as impossible in foreign trade as it is in domestic trade, any attempt to crush, stifle, and throttle a new industry on the part of competing rivals beyond the seas.

It remains now to outline what has actually been accomplished toward a material alleviation of the hardships of this period of famine through which we are passing, and to what extent the foundations are being laid for an independent American coal-tar chemical industry.

INCREASE IN OUTPUT OF AMERICAN DYES

In the first place, the few existing American establishments devoted to the manufacture of artificial dyestuffs have notably increased their production. Prior to the war they made a somewhat limited amount of coal-tar colors. The annual output was about 3,300 short tons. For the purpose of their manufacture, intermediates were imported, chiefly from Germany. These were assembled into finished dyes by the aid of a few American chemicals, and by the labor of not over 400 workmen.

With a nearly total cessation in the importation of intermediates came the necessity for a complete revolution in the organization of the modest American industry. Prompt and resolute decisons were made. Great sums of money were invested in new plants. Before the war was 12 months old the output of American coal-tar colors had doubled. Too much praise can not be given to the men who accomplished this tour de force.

This involved a notable increase in the production of coal-tar crudes. It also called into existence a number of new companies engaged in the manufacture of intermediates, especially of aniline.

The domestic supply of the crudes has now assumed large proportions. The approximate monthly output at present, in short tons, is: Benzol, 7,500; toluol, 7,870; xylol, 950; naphthalene, 12,500; phenol, or carbolic acid (chiefly synthetic), 10,000 tons. Unfortunately, the demand for phenol, benzol and toluol, to be used in the manufacture of explosives, is now so abnormally high that there has been some difficulty in securing enough for the makers of coal-tar intermediates. The manufacture of these latter, especially of aniline, has suddenly grown to considerable proportions and is constantly increasing. There are over seventeen firms engaged in this branch and others are entering the field. There are twelve firms now engaged in making finished coal-tar dyestuffs.

LIST OF MANUFACTURERS

A list of the firms now occupied with the manufacture of coal-tar derivatives is here given, in view of the multitude of inquiries regarding American sources of the coal-tar products, formerly secured from European manufacturers:

Manufacturers of Coal-Tar Crudes.

The Barrett Manufacturing Co., 17 Battery Place, New York City.

Bayway Chemical Co., Bayway, Elizabeth, N. J.

Baird & McGuire (Inc.), 23 Allerton Street, Roxbury, Boston, Mass.

Samuel Cabot (Inc.), 141 Milk Street, Boston, Mass.

Isaac Winkler & Bro., Cincinnati, Ohio.

Thomas A. Edison, Inc., Orange, N. J. (synthetic carbolic acid; monthly 150 short tons).

Manufacturers of Coal-Tar Intermediates.

The Benzol Products Co., 25 Broad Street, New York City (aniline, substituted anilines, and hydroquinone). The extensive works at Marcus Hook, Pa., has received notable additions. It is now the leading source of supply. This company, organized in 1910, was the first to manufacture aniline on a large scale in this country.

Thomas A. Edison, Inc., Orange, N. J. (aniline, paraphenylene-diamine). The monthly production of aniline is 138,000 pounds; of nitrobenzol, 45,000 pounds.

The Midvale Chemical Co., Elizabeth, N. J. (aniline).

The American Synthetic Color Co., Stamford, Conn. (aniline).

The Blackstone Chemical Works, 531 Grosvenor Building, Providence, R. I. (aniline).

Paul Weiller, 326 Front Street, Perth Amboy, N. J.

Middlesex Aniline Co., Lincoln, N. J. (aniline).

May Chemical Co., Perth Amboy, N. J. (aniline).

Upton Brothers, Bristol, Ind. (aniline).

The United States Coal-Tar Products Co., 40 West Thirty-second Street, New York City (aniline).

Seydel Manufacturing Co., 86 Forrest Street, N. J. (aniline).

The Chemical Co. of America (Inc.), Springfield, N. J.; office, 320 Broadway, New York City (aniline).

The Butterworth-Judson Co., Newark, N. J. (aniline).

American Synthetic Dyes (Inc.), Newark, N. J.; office, 60 Wall Street, New York City (aniline).

Standard Aniline Co., Wappingers Falls, N. Y.; office, 366 Fifth Avenue, New York City (beta-naphthol and paranitraniline).

The Monsanto Chemical Works, St. Louis, Mo. (dinitrochlorbenzol).

The Middlesex Chemical Co., Chester, Conn.

Manufacturers of Artificial Dyestuffs.

Schoellkopf Aniline & Chemical Works (Inc.), Buffalo, N. Y.; office, 100 William Street, New York City. This is the oldest and most important company engaged in this branch. It was organized in 1879. Prior to the war it manufactured over 100 different dyestuffs. Its colors are used very largely by the cotton textile mills, but also by silk, woolen, and other industries.

W. Becker's Aniline & Chemical Works, 105 Underhill Avenue, Brooklyn, N. Y. The works of this company, completed in June, 1915, are very extensive. It manufactures a large variety of dyestuffs and specializes on colors for the woolen industry, more particularly alizarin substitutes. Capital, $1,000,000.

Heller & Merz, Newark, N. J.; office, 505 Hudson Street, New York City. This company specializes on coal-tar colors used for the manufacture of paper, in connection with its extensive production of mineral pigments.

The Central Dyestuff Co., Newark, N. J. A variety of dyestuffs, for use in all branches are manufactured.

The Consolidated Color & Chemical Co., Newark, N. J.; office, 122 Hudson Street; New York City. The production is limited to a small group of standard aniline dyes, used chiefly in textile mills.

The Bayer Co. (Inc.), Rensselaer, N. Y.; office, 117 Hudson Street, New York City. This company manufactures some of the colors which are specialties of the Bayer Co., of Leverkusen, Germany.

The Pearsite Co., Clay City, Ky.; office, 346 Broadway, New York City. This company, recently organized with an authorized capital of $2,000,000, manufactures a group of seven colors, from the products of the distillation of cannel coal.

The Federal Dyestuff & Chemical Co., Kingsport, Tenn.; office, 30 Pine Street, New York City. This company, organized in October, 1915, with an authorized capital stock of $15,000,000, plans for the construction of several plants in different sections of the country. The first plant, at Kingsport, Tenn., is largely devoted to the production on a vast scale of sulphur black.

A. Klipstein & Co., West Charleston, W. Va.; office, 644 Greenwich Street, New York City. The recently constructed factory of an old and well-known importing house is chiefly devoted to the manufacture of sulphur dyes—browns, and especially sulphur black.

The Dow Chemical Co., Midland, Mich. This company has embarked upon the manufacture of synthetic indigo.

The American Co-operative Dyes & Chemical Co., 848 Drexel Building, Philadelphia, Pa. This company is devoting its attention at the outset to the manufacture of direct blacks for cottons.

The United Securities Dye and Chemical Co., Wilmington, Del. Incorporated December 11, 1915. Authorized capital, $5,000,000.

ANILINE AND ANILINE BLACK

Aniline itself, when destined for use in dyeing aniline black, should be classed as a finished dyestuff. A large share of the aniline now being produced is used for this purpose, especially in hosiery mills. When noting that a single firm, such as the Edison company, is turning out 69 tons of aniline

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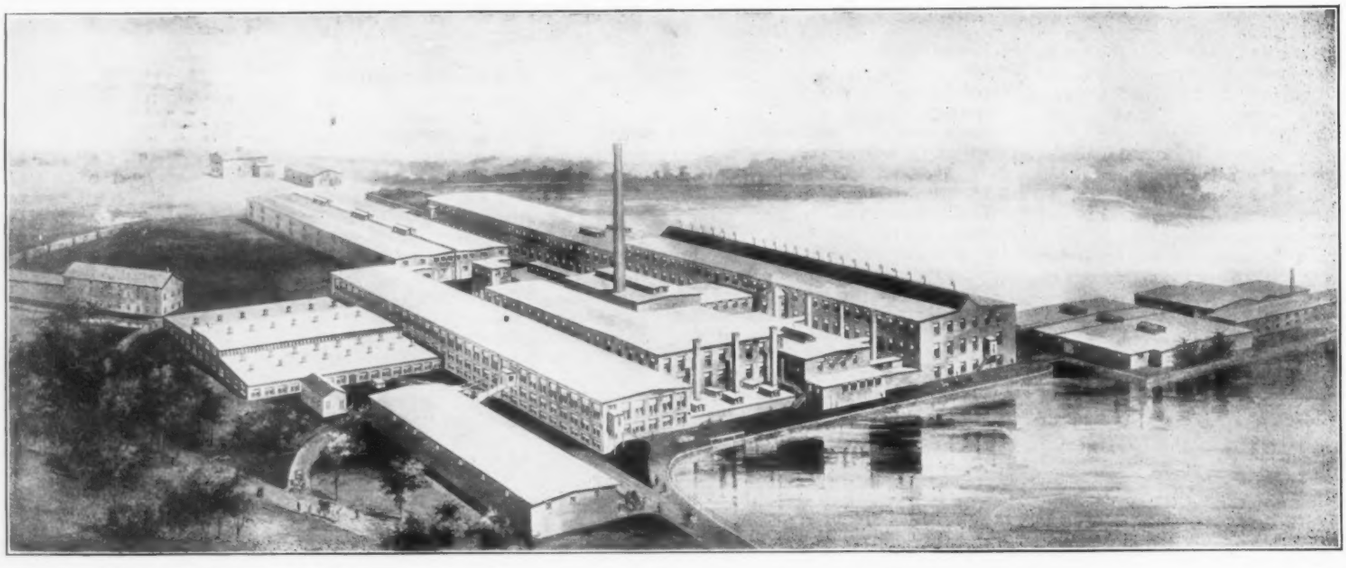

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each month, it is possible to grasp what is being done to lay the foundations for a comprehensive American dyestuff industry.

Verbally and in print it has seemed necessary to emphasize the eminent desirability of increasing the output of aniline rather than to branch out into the manufacture of a varied list of dyes. Ambitious young chemists are keenly desirous of bringing out at once finished dyestuffs in a greater or less variety. As a rule, they now recognize that they can best serve the textile and other industries dependent upon colors by concentrating their efforts on aniline. The logic of the situation plainly shows that in no other way can they, for the time being, make plant, time and effort count as effectively in lessening the hardships of the current famine. Four-fifths of our hosiery are dyed black, and the extent to which black is used for both men's and women's apparel is evident to all.

An interesting feature in the evolution of this aniline industry—in the narrower sense of the term—is the introduction of small plants for making the oil, devised more particularly for installation in textile works, consuming relatively limited amounts, for the production of aniline black. An enterprising Rhode Island firm, manufacturing itself considerable quantities of the oil, is now installing in various textile mills standard plants capable of producing daily 100 pounds or more of aniline. Such a plant, built to produce 100 pounds daily, costs from $1,500 to $2,000. The services of a single operative are needed to carry on the transformation of benzol into aniline, with occasional assistance in the moving of heavy objects. The operations and the application of the requisite tests can be intrusted to a man of ordinary intelligence without chemical education. The ordinary output is 85 pounds of aniline for each 100 pounds of benzol employed. At current rates for this hydrocarbon it is found possible to make aniline at a net cost of from 30 to 40 cents per pound. This compares favorably with the daily quotations of $1 to $1.40 for immediate delivery and of $0.70 to $0.85 for early contract delivery. Within the past month two textile mills have contracted for larger plants, capable of furnishing 500 pounds of aniline daily.

The policy of all the companies engaged in the direct manufacture of finished dyestuffs has been eminently a wise one. They have resolutely contracted the range of dyes which they attempt to put on the market. There has been a corresponding increase in the quantity of actual dyes manufactured in a given period.

It is evident to all that under existing circumstances every possible effort is to be directed toward enlarging the volume of the output, and this can be secured only by severely limiting the number of different dyes produced and by corresponding simplification in organization and plant. How easily this can be done, without involving any serious hardships to consumers of dyestuffs, can be illustrated from the practice in the silk branch.

It is a welcome fact that two well-equipped works are now about to manufacture sulphur black on a large scale, as shown in the list above. Two other works engaged in the production of intermediates have perfected their arrangement to make ample supplies of the dinitrochlorbenzol required in this special branch.

The most interesting feature to note in this development is the establishment recently on our soil of the commercial production of synthetic indigo. This manufacture has been taken up by one of the older chemical companies and with success. The daily output will soon reach 6,000 pounds. Naturally all that can be made is sold for months ahead. Three other powerful firms are carefully studying the possibilities of manufacturing this most important dyestuff.

THE PROMISE OF THE FUTURE

What is being done to lay the foundations of a genuine, comprehensive, self-contained, American coal-tar chemical industry, one which will free the country ere long from all economic dependence on foreign sources for the element of color, as needed by our vast textile and allied interests?

In reply it may be stated that amidst all the great haste to meet pressing and insistent demands, with the enlargement of existing plants and the erection of new plants there is every evidence of thrift and economy. This augurs well for a complete absence of unnecessary overhead charges, as the scope of the industry broadens.

As a rule, the firms now engaged in the production of intermediates contemplate the manufacture later on of finished dyes. Mr. Edison, who has done such magnificent work in this field by his rapid organization of the production on an extensive scale of synthetic carbolic acid and of aniline, does not intend to continue the output of the latter after the close of the current war. With this exception all of the numerous firms now occupied with the manufacture of coal-tar compounds are planning to continue their production along the lines already taken up, and to enlarge such production or enter upon the manufacture of additional intermediates or finished dyes, as circumstances dictate.

The extent to which capital has been enlisted in the development of the dyestuff industry is indicated in the list of companies now in full operation. Several other smaller companies, lately incorporated for active work in this field, reveal a widespread tendency among investors to enter vigorously upon a campaign to build up a coal-tar chemical industry.

There is quite noticeable an evident effort on the part of some ardent chemists to further the movement by attempting the introduction of hitherto unknown organic dyes, produced apparently by relatively simple chemical reactions, some from coal products, others from petroleum waste. Such attempts are regarded with a benevolent eye, as are all other efforts made intelligently and earnestly to limit the strain of the dyestuff shortage. Time must elapse before careful and exhaustive testing shows the permanent value of these new dyes, as regards cost of production and actual tinctorial properties.

Possibly some of the new colors, of entirely unknown composition, may possess enough tinctorial value to warrant their use during the period of a distinct color famine. No prophecies can be made as to the permanent value, when brought under normal conditions into keen competition with highly perfected coal-tar dyes of standard qualities.

It is distinctly to be regretted that in the daily press statements have occasionally appeared tending to convey the impression that these attempts to produce new dyes—for they can not be regarded as more than attempts—were destined to revolutionize the whole color industry and immediately solve the problem of a dyestuff shortage. The entire lack of basis for any such optimistic claims was promptly and repeatedly shown by this Bureau, in printed statements and in public utterances. While no intelligent chemist was misled by press announcements of this character, they unfortunately did cause more than one manufacturer, dependent upon the color factor, to feel as if all danger of a "dyestuff famine" would soon be removed.

FAVORING CONDITIONS

The conditions favoring the establishment of a permanent, comprehensive American coal-tar chemical industry are as follows:

The United States possesses all the needed raw materials in abundance, in such amount that it could meet the demands of the world's dyestuff industry. It offers the largest existing market for the consumption of dyestuffs.

Enterprise, inventive talent, and technical ability are present to an almost unlimited extent.

The time is eminently propitious for the establishments of a national industry. All indications point to the continuance for a year or two of conditions—most deplorable in themselves—which favor a period of construction free from the disturbing element of foreign competition. Capital is ready to enter the new field in ample amount and is daily being invested.

It demands simply an adequate measure of statutory protection against unfair competition on the part of foreign rivals. This, we now have every reason to hope, will soon be accorded.

POSSIBLE SWISS CO-OPERATION

There is possibly one factor lacking to bring rapidly into existence a comprehensive American coal-tar dyestuff industry. That is the co-operation of a few men possessing highly developed capacity for organization, combined with a perfect experimental command of the exceedingly complex and intricate field of color chemistry in all its ramifications—men such as created in the past the great works on and near the Rhine, or those now directing them. It might be possible to secure such needed co-operation from the large and well-equipped staffs of the four color works at Basel, in Switzerland.

These highly specialized staffs include scores of men of broad experience in the manufacture of the whole range of coal-tar dyes. Most or them have enjoyed in earlier days the advantages of the "Polytechnic" of Zurich, one of the best equipped institutions in Europe for the training of color chemists. Many have served a more or less extended apprenticeship in the gigantic German chemical works.

It is not difficult to imagine a union of forces in this field—a consolidation of interests between the Swiss companies and the American firms now striving to expand, but forced, as it were, to grope in the dark at times. The transfer of a sufficient corps of Swiss expert color chemists to the United States, at this critical moment, would be of untold value in furthering the rapid evolution of the American industry.

It would be possible, by their aid and direction, to attain, as regards time and money, the maximum of economy, in constructing new plants, in adopting the most practical and effective mechanical devices, in applying the most economical methods, in co-ordinating the diversified features of a complicated branch of manufacture, so as to avoid loss of material and restrict the dependence upon highly skilled and expensive labor. At every step in the organization of a new plant, and in the initial months of its operation, directive co-operation of practical experts would insure the establishment of a self-contained coal-tar color industry on American soil, with a minimum of outlay and a maximum of efficiency, in the shortest possible period of time. It would probably enable the industry, in its broader phases, to become so thoroughly rooted in the economic life of the country that, upon the return of normal international exchanges, legitimate competition of foreign rivals could be easily and effectually met.

SWISS CHEMISTS AND RUSSIAN PROBLEMS

A striking example of how the dyestuff problem of a great nation can be solved by the co-operation of Swiss intelligence and experience is now seen in Russia. The textile and allied interests of the Russian Empire formerly depended chiefly upon Germany for color materials. The largest dyestuff company of Germany conducted a branch factory in Russia prior to the war. Dependence upon Germany for semi-manufactured material and for finished dyes was quite as pronounced as in our own country or in Great Britain.

The sudden interruption in current supplies of dyes, consequent upon the outbreak of hostilities, was a heavy blow to Russian textile works. A way out has been found by the organization of a strong company, of which the leading dyestuff house of Basel is a constituent member. This latter furnishes an administrative and technical staff—in other words, the "brains" of the undertaking. Capital is supplied by a group of prominent Russian textile manufacturers who at the same time are the chief consumers of the dyes produced.

The arrangement is eminently practical. As in the recent British organization, the consumers of dyestuffs are the owners and controllers of the undertaking, and a continued market for the output is assured. An abundant source of crude material is furnished by the Russian coke works. The requisite factories have been erected at a considerable distance from the present line of military operations.

What has been done so easily and simply in Russia to meet present emergencies and lay the foundation for a future national dyestuff industry can serve admirably as an object lesson to the United States, ordinarily so much more prompt in recognizing and improving industrial opportunities.

The creation of a comprehensive manufacturing plant by an alliance between Swiss experience, enterprise, and skill on one side and the large financial resources under the control of our great textile interests on the other side, is a solution by no means difficult of realization. It would assure capital, management, and market, the three essential factors to success.

A less complex, and perhaps more feasible, method of accomplishing the end in view would be found in establishing a comparatively close organic connection between individual Swiss companies and individual American companies already engaged in the active manufacture of dyestuffs, but limited hitherto to a very narrow range of products.

Correspondence is now under way, which may lead to a more or less close co-operation between the dyestuff interests of the two republics.

PROBLEMS TO BE MET

There are several other phases in the evolution of an American color industry which deserve careful attention at the present time.

NECESSITY OF UNITY

The first is connected with the somewhat rapid entrance into this field of a number of separate interests. imperfectly acquainted with the complexity of the problem.

It is well known to every one who

THE ELTON COP DYEING COMPANY, Ltd., Bury, England

Announce A

Revolution In Dyeing—BEAM DYEING

(Brandwood's Beam, Cop and Cheese Dyeing Machines protected by patents in all industrial countries)

DYEING AT ONE OPERATION ONE TO TWELVE BEAMS all the fastest known colors, including Indigo, Hydron, Indanthrene, and other Oxidiation colors. This system is destined to revolutionize yarn dyeing by enabling colored goods manufacturers to dye and size their own yarn on the beam, thus dispensing with warp and chain dyeing and dressing, and all its attendant evils.

The great advantages of this system of Beam Dyeing are:—

(1)—The most economical way of dyeing in existence. The full set of beams required are dyed at one operation, thus ensuring one uniform shade at the minimum cost. The dyehouse labor cost is reduced to a very low figure, together with some saving in dyeing materials and floor space.

(2)—The beaming and dressing costs are saved altogether.

(3)—An average of 10% greater production from the loom, because all the elasticity and stretch is preserved in the yarn.

The dyeing is guaranteed even and level, and suitable for solid cloths of all descriptions, and Plants are already at work in the States, and on order capable of dyeing one million pounds weight of yarn weekly.

Beam dyeing is of no service to the small manufacturer, or where the weights to a shade are small and varied.

FOR FULL PARTICULARS AND ESTIMATES APPLY TO

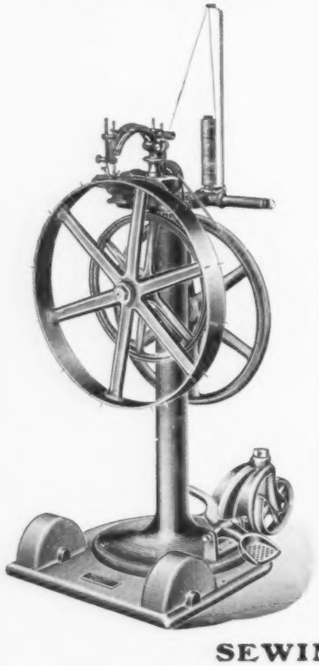
C. P. DELAHUNTY, Pres.

DELAHUNTY DYEING MACHINE CO., Pittston, Pa. *AGENT FOR THE UNITED STATES*

DINSMORE MILL SEWING MACHINES

for all sewing requirements in

Cotton, Woolen, Silk and Knitting Mills, Print Works and Bleacheries



Why

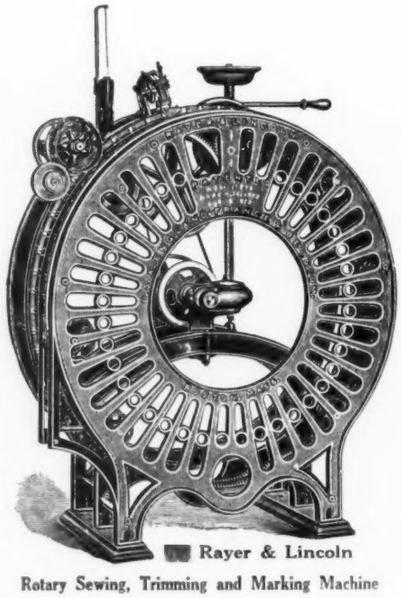
are "DINSMORE" MILL SEWING MACHINES in use in about every prosperous Cotton and Woolen Mill in this country?

Just because

They sew nearer the edge than other machines—saving big losses.
They sew straight—never in crooked lines.
They do not require skilled help—big saving.
They keep the cloth clean and free from wrinkles.
They cannot be surpassed for speed.
They sew wet or dry cloths, thick or thin.
They know no superiors in workmanship.
They have no rivals in quality.
They pay for themselves in six months.

We claim the "Dinsmore" is the most efficient and economical mill sewing machine ever put upon the market and we are prepared to prove our claims.

Descriptive Catalog on Request.



Rayer & Lincoln

Rotary Sewing, Trimming and Marking Machine

SEWING MACHINE SUPPLIES CONSTANTLY ON HAND

DINSMORE MANUFACTURING COMPANY, Salem, Massachusetts

has studied the fundamental basis of the past dominance of German color chemistry in the world's markets, that the chief cause of this marvelous control lies in the solidarity of the German industry as a whole. It is so organized that all the correlated parts act in unison. They form practically a unit when, in any land, a serious effort is exerted to secure freedom from dependence upon foreign sources of color.

The question now arises. Is it not eminently desirable that a comprehensive American coal-tar industry, striving to supply nearly all American tinctorial needs, with products made from American raw materials, should possess a higher degree of unity—financial, technical, commercial—than now is the case? Is it not of prime importance that all unnecessary overlapping and duplicating of effort be excluded, at least in the formative stage?

The problem is more easily stated than solved. It is economically important, during the initial period, that the industry should be characterized by that unity and solidarity which contribute so largely to the might and effectiveness of the German rival; and yet it must be free from any tendency toward monopolistic power.

For the moment it suffices to express an aspiration, a hope, for economic conditions which may powerfully aid a young industry in bravely holding its own.

A very distinct element of strength to a growing domestic color industry would undoubtedly result from the establishment of a bureau of standards for dyestuffs possibly by the combined action of the great textile organizations. Such a bureau could be modeled after the admirable Division of Chemistry in the well-organized Bureau of Standards of the Department of Commerce. Its function would be to formulate the physical and chemical criteria of purity for all dyestuffs, exactly as is now done for the drugs listed in our pharmacopoeia. In the laboratories of such a bureau—and they would necessarily be vast—it would be as easy and simple to check and control the tinctorial for our medicinals.

Such principles of standardization could likewise be applied to the varied methods of the application of colors on the different fibers and on other wares. A single finely equipped bureau could advantageously replace the multitude of laboratories now maintained by rival dyestuff firms or in textile works. Such an institution could effectively protect a half-grown American industry against attempts to depreciate the quality and value of American-made dyes, and could insure a far greater degree of economy in cost of production than otherwise would be possible.

Everyone familiar at all with the employment of colors in dyeing can easily picture to himself the enormous advantages resulting from the impartial and exact classification and standardization of all coloring materials encountered in commerce, or the sipmlification, economy, and certainty, attendant upon their use in connection with the different fibers and fabrics, as well as with leather, feathers, ink, varnish, paper, etc.

Instead of hundreds and thousands of isolated, blundering attempts to obtain the best dye for securing certain color results, the desired data could be requested by return mail from a national laboratory. If a dyer wished to know exactly under what conditions, and in what quantities, a given dye should be employed to produce certain tinctorial effects upon a specific fiber, with a minimum expenditure of color, the full directions could be obtained, free of cost, with but little loss of time.

THE COMING INDUSTRY

A dyestuff industry this country is bound to have unless all indications prove false. Our textile and other allied interests resolutely demand that they shall never again be exposed to the disasters accompanying such a dyestuff famine as we now face.

American chemists insist that the one great branch of color chemistry, now wanting in the cycle of our national industries, should be created in all its ramifications upon our soil; and that American chemical technology should no longer be so conspicuously lacking in the most brilliant feature of applied science.

Crucial Factors in the Dyestuff Problem

By J. Merritt Matthews, New York

SHORTLY after the war broke out the textile manufacturers of this country began to realize what important articles dyestuffs were, and how absolutely essential their supply was to the needs of the industry. They further realized how absolutely dependent we Americans were upon foreign countries for these common articles of trade. The alarm of a coming dyestuff shortage was soon raised, and this was accentuated and made real by the acts of England in blockading German commerce and those of Germany in placing an embargo on the exportations of dyestuffs and coal-tar products. Immediately every mill tried to buy up all the dyes it could lay its hands on, so as to provide a generous supply for the future. Evidently, the stocks on hand with the various dyestuff importers were sufficient to furnish a supply of from six months to one year, and as the war kept on and time passed, these stocks were gradually depleted, so that at the present time they are practically gone. There must have been considerable speculation of one kind or another in these dyestuffs, however, for even to-day it is possible to pick up odd lots of 50 to 1,000 pounds of various colors which are generally largely diluted and held at exorbitant prices.

GROWTH OF DOMESTIC INDUSTRY

To this supply must be added that of the domestic producers of dyestuffs. At the beginning of the war the manufacture of dyestuffs here in America was very small and greatly restricted in variety. Furthermore, most of the dyes that were produced were made from intermediate coal-tar compounds imported from Germany; when the supply of these intermediates was cut off the variety of dyestuffs that was made here became greatly restricted. There has, however, been a healthy growth in the number of dyestuff factories here, built up on the feverish demand for colors and the consequent possibilities of large profits. The National Aniline & Chemical Company have greatly increased the size of their plants at Buffalo, and while the variety of their products has been considerably restricted by the cutting off of the supply of German intermediates, this company have greatly increased their output of certain colors, especially their direct black for cotton. The Becker's Dyestuff Co. has developed wonderfully, considering the conditions and difficulties such an industry has to overcome. They are doing excellent work in turning out several acid colors and are increasing their production as fast as humanly possible. There are a number of smaller concerns making a restricted number of dyestuff products, and these are helping the general situation considerably.

OTHER SOURCES OF DYES

Now besides this every-growing domestic production there has been another source of dyestuffs in importations from China. During the past six months very large quantities of dyestuffs—both indigo and other general aniline colors—have been brought into this country from China and the Far East. These colors are German dyes which the Chinese have had on hand and are glad to sell to us at the high prices offered. I have been told that over a million pounds of indigo have come to us from this source, as well as approximately a million pounds of other dyestuffs. This supply has helped us considerably in our need, and has kept in operation many a mill, perhaps, which would otherwise have been forced to shut down from lack of colors. The Chinese evidently look forward to a white season this coming year and apparently can adapt themselves to such a condition better than we could; at any rate, it is evident they would much rather have the money than the dyestuffs.

A further source of dyes has been the natural colors, though not very much relief has been obtained from this quarter. The use of logwood, of course, has been much increased under the present circumstances for the dyeing of blacks; and there has been a slight revival among some of the other natural dyes such as fustic, cochineal, archil, and the redwoods. The use of natural wood colors, however, requires such a readjustment in the methods of the dyehouse, that such dyes are not at all favored, and their use is further restricted by the fact that they do not yield the required shades, nor have they satisfactory fastness.

This briefly summarizes the various sources of our dyestuffs under the present circumstances. The supply from China or other such countries is, of course, limited, and has perhaps already been practically exhausted. At the present time there does not seem to be much hope of securing further shipments of dyestuffs from Germany, nor is it probable that the German factories are producing any quantities of dyestuffs, owing to the unprecedented demands which must be made upon them for high explosives. I should judge that practically all of the available coal-tar products in that country, as well as their supplies of acids are at present being employed for war purposes. The hidden supplies of German dyes in this country must also be nearing utter depletion, if one may judge from the frightful prices being asked for small lots of colors. Reversion to the use of natural dyes does not appear to have helped the situation to any great extent, nor can I see any future hope in this direction. During the continuance of the war, therefore, i. appears that we must look with increasing anxiety toward our domestic production of dyestuffs as practically our only hope.

COMPLICATED NATURE OF PRODUCTION

Let us look somewhat closely into this problem of domestic dyestuff production, for it seems to be rather clearly established that if the war is to last several years longer we will be forced to rely entirely on the American factory for our supply of dyestuffs. Unfortunately there are very few textile manufacturers who understand with any degree of clearness the complex nature of dyestuffs, what they are made from, and the general scheme of the process of their manufacture. I have met a few manufacturers who do exhibit a surprising degree of information on the subject of dyestuffs, but it is hardly to be expected that many of you would have more than rather elementary ideas on such a matter. You all know, perhaps, that practically all dyestuffs are made from products derived from coal-tar; they do not exist as such in the tar from which they can be separated by simple processes, but they have to be actually constructed, built-up (or what is known as synthesized) by a variety of chemical processes and operations. A dyestuff may be likened to a house; it is complicated in structure, and it is built up of a number of different parts. A dyestuff consists of a variety of different parts which must be properly joined and fitted together, and these subsidiary or underlying parts are termed intermediates, and are derived from coal-tar. The man who wishes to go into the manufacture of dyestuff is provided only with his crude materials, the coal-tar distillates, and from these he has to build up his various intermediates, before he can hope to construct the actual dyestuffs. And it is about as difficult and complicated a proposition to build up many of these intermediates as it is to construct a fine Yale lock out of a bar of crude pig iron.

OUTLOOK FOR DOMESTIC PRODUCT

The question that naturally presents itself to the textile manufacturer is: What is the outlook as to the production of dyestuffs in America within the next year? As the stock of dyestuffs becomes smaller with each passing week, and an absolute famine stares us in the face, this question becomes an all-important one to the woolen and worsted manufacturers.

AVAILABILITY OF MATERIALS

It is well known that a number of new chemical plants have even now started the actual production of such substances as aniline, phenol, beta-naphthol, paranitraniline, various acid dyes and sulphur black. There is produced considerable quantities of benzol, toluol, naphthalene, and certain other coal-tar distillates, but unfortunately nearly all of these are in such great demand for the manufacture of explosives, that the dyestuff industry can obtain them only at exorbitant prices or not at all. Benzol is selling at 55 to 70c. per gallon, and toluol as high as $5.50 per gallon, and any manufacturer starting in now finds it almost impossible to make satisfactory contracts even at these prices. Aniline oil, which is now coming into the market in fair amount, is quoted at 60c., and higher per pound, phenol (or carbolic acid) at 90c. to $1.10 per pound; naphthalene, which even for some time subsequent to the outbreak of the war sold at about 3c. per pound, is now hard to get even at 9 to 12c. Many of the needed dyestuffs require the use of toluol, or its derivative, toluidine, but at present high prices the cost of such dyestuffs becomes practically prohibitive. Again the dyestuff industry is based not only on coal-tar derivatives, but requires the use of large quantities of sulphuric and nitric acid, and especially sulphuric acid of very high concentration, which has to be made by what is known as the contact process. The normal price of ordinary sulphuric acid (of 66 degrees Be.) was about $15 per ton; this acid now is bringing $35 to $45 per ton on future contracts, and $60 to $70 per ton for immediate deliveries. A number of new acid plants, however, are in course

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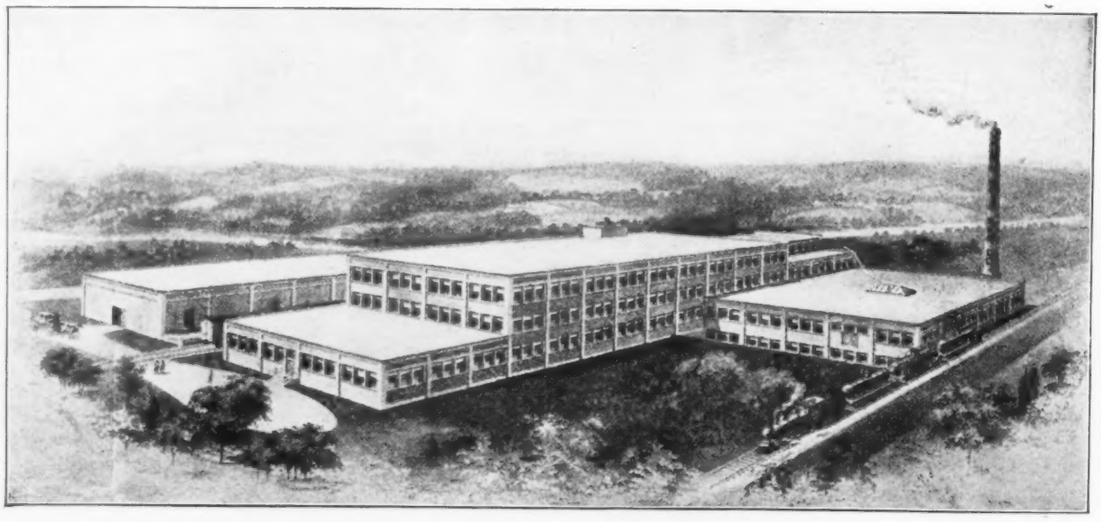

Fulling, Scouring, Potash, Special Finishing and Silk Soaps

Cotton Softeners

Caustic Potash, Caustic Soda, Ammoniated Potash and Scouring Salts

of construction, and at the present time there are indications that the acid market is somewhat easier. Oleum, a highly concentrated acid, however, at the present time is almost impossible to obtain for new dyestuff work. Nitric acid is very essential to the making of a large number of the intermediates needed in producing dyestuffs; this acid is now exceedingly difficult to obtain in any quantity, and only at very high prices. Caustic soda is another product very extensively used in dyestuff manufacture. This article has advanced in price to 5c. per pound, and no large contracts are available even at that price. The same condition is true of many of the other chemicals needed in the manufacture of dyestuffs. Another factor to be considered is the machinery equipment and special chemical apparatus required. In many cases this is difficult to obtain, suitable stoneware and aluminum apparatus is almost impossible to get, and recourse must be had to other acid resisting materials.

So you can readily see that any one starting in to erect a plant for the manufacture of dyestuffs is beset with difficulties at the very start, difficulties which well might take the enthusiasm out of any conservative business man—and yet there are daring spirits with sufficient courage to venture on the enterprise. There are even some textile manufacturers themselves who have been sufficiently daring to embark on the enterprise of making their own aniline, bearing the cost of equipment and plant, technical organization, and raw material in order to obtain some assurance of being able to run their plants during the next few years.

INTERLOCKING ELEMENTS

There is also another factor in the matter of manufacturing dyes which must be carefully considered, and it is one which relates to the peculiarity of the chemical reactions involved. In the manufacture of a certain dyestuff, for instance, I may need as an intermediate product nitrophenol, a substance obtained by treating phenol with a mixture of nitric and sulphuric acids; this at first hand would seem a comparatively simple proposition, but here is where the peculiarity of coal-tar products comes into action—there are three different nitrophenols produced in different amounts and the special one that I can use for the dyestuff in question, is the one that is formed in only a relatively small amount—the others are useless to me for the purpose in hand; if I have to discard them as worthless the resultant cost of my special nitrophenol becomes exceedingly high, putting a consequent burden of cost on the dyestuff to be produced. Proper manufacturing economy would require me to utilize the other nitrophenols, but this would lead me into the manufacture of other articles in which neither I nor any one else has just now any present interest. This simple illustration is generally true of most of the products derived from benzol, toluol, phenol, aniline, naphthalene, etc., only in many cases the diversity of secondary products is much more extensive. Under the present conditions of operation it is practically impossible for a new dyestuff plant to work up with any economy those secondary products.

TARIFF AND ANTI-DUMPING LAWS

A publicity campaign such as has been conducted by the Government's representative of a Bureau of the Department of Commerce will not in any manner help the dyestuff industry here or in any manner help the textile manufacturer to obtain a relief from the dyestuff shortage. What we want in this country is some effort by the Government to aid in the organization of a dyestuff industry, and that is what we all thought was the Government's original intention in going into the matter at all. We hardly expect our Government to assume a paternal attitude, such as shown by the governments of various foreign countries, and notably England, Russia and Japan. Considerable discussion has been had on trying to protect the growing dyestuff business here by anti-dumping laws to be enforced against subsequent foreign competition. A few hackneyed instances of flagrant dumping of dyestuffs and aniline in this country some years ago by the Germans, in order to choke off the manufacture of these products, are constantly being quoted in all discussions on this subject. Personally, I do not see how anti-dumping laws would be of much avail in giving any positive encouragement to the dyestuff industry. We must face the realization that the highly perfected German dyestuff organization can produce dyestuffs far cheaper than we Americans could for a long number of years. Our whole coal-tar and chemical industry must be built up into an elaborately organized structure, one part correlating with another to produce high economic efficiency.

CONSTRUCTING THE FOUNDATION

We are gradually building the firm foundations of a chemical enterprise which will be a lasting benefit not only to the textile industries but to many others on which the industrial activities of our nation depend. The gas works and the steel and coke producers have accomplished praiseworthy results during the past year in the production of coal-tar and the recovery of the by-products therefrom. The amount of development work in this line which has quietly gone forward is indeed remarkable if we bear in mind that it was a character of work far removed from American science and technique. Our engineers and chemists have shown themselves equal to the task imposed upon them; our apparatus and machine designers and builders have exhibited remarkable ingenuity and resourcefulness in the construction of new types of apparatus to meet the requirements suddenly imposed upon us. I believe that in this respect we have risen to the occasion with far more promptness and success than any other nation would have done under the same circumstances.

We have already laid a firm foundation for the dyestuff industry in the manufacture of coal-tar crudes—that is to say, the primary distillates from the coal-tar itself. The next step is the erection of the more complicated and properly correlated framework consisting of the coal-tar intermediates under which designation are included substances such as aniline, phenol, toluidine, benzaldehyde, benzoic acid, salicylic acid, alpha and beta-naphthol, the naphthylamines, the various sulphonic acids of the naphthols and naphthylamines, benzidine, tolidine, dianisidine, carbonyl chloride, Michler's ketone, anthraquinone, chlor-benzol, benzal chloride, phthalic acid, resaniline, dimethylaniline, diphenylamine, phenylenediamines, and a number of other similar substances, the enumeration of which would be presuming upon your patience. I may say that a number of these products are now being actively manufactured here, and the list is being constantly added to. It requires time and patience, however, to accomplish this—these products cannot be wished into existence—they must be worked into actual being.

FACTORS GOVERNING PRODUCTION

The progress of the manufacture of dyestuffs in this country will naturally be along the lines of least resistance, coupled with the pulling force of the demand for particular lines of colors. Volume of product has a good deal to do with determining the desirability of manufacture. We will naturally turn our attention first to the production of that material which can be sold by the ton rather than to one that can be marketed only by the pound, other things being equal. Again, those dyes will naturally be first made for the manufacture of which the intermediate or raw materials are most readily available. All these factors have to be carefully considered by any one entering upon the manufacture of dyestuffs, and as much as he might desire to meet the insistent demands of the textile trade for this, that, or the other special dyestuff, he must be guided by the manufacturing conditions he encounters in order to establish his industry on a firm business basis. It is not reasonable to expect any intelligent man to embark in the manufacture of dyestuffs in a haphazard and indiscriminate manner—such an enterprise would soon be doomed to failure. A scientific study of the conditions must be made, the products to be manufactured must be carefully selected with reference to the raw materials available and the simplicity of the processes involved; an organization must be built up containing competent chemical skill and advice, together with proper engineering and manufacturing ability, and, furthermore, the ever-necessary financial backing must be available. Every manufacturer well knows that such an organization cannot be built up in a day but requires intelligent effort at correlation and painstaking work in industrial management.

INTERMEDIATE MANUFACTURE NECESSARY

Already some of the large manufacturers of explosives are looking ahead, and are getting together an organization to develop the facilities of their plants so as to manufacture coal-tar products when the demand for explosives has lessened. The logical direction to which they turn is the manufacture of various coal-tar intermediates, and once this industry is gotten under way a rapid development in the manufacture of dyestuffs will come as a matter of course. I know the textile manufacturer is impatient; he sees before him in a short time an absolute famine in most dyestuffs, and he begins to realize that soon the only way for us to get dyestuffs is to make them, but let him also remember that he must assume some of the burden and risk in the enterprise. The manufacturer who engages in the production of dyestuffs is not an altruist, he is not going into the business for the sole purpose of helping textile manufacturers in their distress; but like you and everyone else, he is going into a difficult and risky business to make money, and he will be forced to distribute his risks over the selling price of his products. He is called upon to put up an expensive and special plant, and he must reckon first on paying off the cost of this plant by the time the war is over, for he will need all his subsequent strength and resources to counteract the stress of foreign competition.

Necessity has been the mother of our new dyestuff industry, and necessity must also be the nurse that rears it into healthy vigor. To be destitute of dyestuffs would be an intolerable condition for many great and thriving industries; the only way to get dyestuffs is to make them; therefore with true American bravery and resourcefulness we are going ahead to make them. As one who is interested in some degree in the forwarding of these enterprises, I come before you to-day as a representative to report progress; we have set ourselves to the task, the machinery is gradually getting in motion; already dye products "made in America" are beginning to appear, and I fully believe I am safe and conservative in saying that within four to six months a very material supply of quite a variety of dyestuffs will be available. The mills of the gods grind slowly but surely, and I trust that over the dark clouds of your present despair the rainbow of promise may arise resplendent in colors obtained with American dyestuffs!

ENGLISH COLOR MAKING

(*Continued from page 53*)

a forty-mile radius. To establish such works is virtually to create a new town. A long time must elapse before the whole can be brought to completion.

SCIENTIFIC WORK DONE

Simultaneously with the industrial development of the dye trade scientific research is proceeding, and the fruits of this are deferred also. The war has not been productive of any discoveries materialy affecting the immediate employment of dyestuffs. It was thought that one had been discovered in the Lodge & Evans process for dyeing wool with the sulphur black used for cotton. The practicability of the process has been demonstrated, and considerable quantities of mixed wool and cotton have been treated under it for the knit-goods trade. At the time of its reported discovery, sulphur black was relatively abundant and direct blacks were scarce. Now sulphur black is just as scarce as acid black, so that the advantage of the method has disappeared, and, after reference to the patent records, some persons deny the novelty of the process. The method has, at all events, ceased to attract interest, and it is possible that little will be heard of it in future otherwise than in special departments of work.

British Dyes, Ltd., is in receipt of a direct government subsidy for the prosecution of research work connected with the manufacture of dyes and grants are also being made to teaching institutions, notably to Leeds University. It cannot be said that premature reports of discoveries are altogether to the advantage of the technical institutes or that their announcements are always fresh. Thus, a professor is exposed on proclaiming that he has unravelled a secret, to the cool reply on the part of a manufacturing chemist that there never was a secret and that the most diligent search has failed to find any difficulty in arriving at the advertised result. Outsiders are not in the best position to judge between the parties, but the occasional conflict between the scientific explorer and the ideas of the works chemist can at least be noticed. Progress during the last twelve months in the Leeds laboratories has been made in the examination of intermediate compounds with a view to the production of dyes. Fifty dyes for wool and fifty for cotton have been thought worthy of presentation and their merits remain to be determined. New dyes are valuable in correspondence with their improvement upon older ones in cost or in other respects, and it is apparent that the comparative merits are not easily settled, even under peace conditions. The work at Leeds is at least under the supervision of one who has added to the stock of valuable colors, for Professor A. G. Green, when chemist to the extinct firm of Brooke, Simpson & Spiller, London, invented the dye primerline.

Should British Dyes, Ltd., fail to add appreciably to the available choice of colors it should not be for lack of distinguished assistance. It has upon its

(*Continued on page 134*)

Established 1815

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Technical Section

Securing Full Service from Starch in Sizing

FACILITIES for sizing yarns were greatly improved when the modern slasher was introduced, giving much greater capacity than the chain sizing, which in turn was very much more rapid than hand sizing. Another improvement in the mechanical part of sizing recently developed is worthy of notice. The production of the weave room is so completely dependent upon a proper sizing of the warp yarn that sizing is considered the most important preparatory process to which the yarn is subjected previous to its being woven into cloth and the value of any means enabling the sizer to better perform his task is apparent.

Starch of some kind is the sizing agent universally employed. In a recent article appearing in the Jan. 1 issue of the JOURNAL under the caption of "The Strength of Starch," it was shown that the strength or sizing value was dependent upon preserving the starch solution in the same condition as when freshly made. Starch solutions were shown to consist of, not a true solution, but a crude or colloidal solution of starch, carrying in suspension undissolved skeletal forms of starch granules. If these skeletal forms are removed or broken down by agitation or if the solution is allowed to cool and is then reheated, the service of the solution is greatly depreciated. Since the deterioration of the starch solution is to a considerable extent avoidable by a proper arrangement of the machines and methods employed in preparing or using the starch solution, a description of an improved method of handling size solutions will be of interest.

SIZE UNDER VARIOUS CONDITIONS

The illustrations at Fig. 1 show microscopic views of starch size solutions of the same percentage strength. The one marked "g" is of freshly prepared potato starch. In a solution of proper strength for sizing, the skeletal forms crowd each other and influence the rate of flow or viscosity of the size. After long boiling, cooling and reheating with considerable agitation the size will appear as in "h" and will have lost its clinging viscuous character. It is "run down." The viscosity or body has been almost wholly lost by simply breaking down the skeletal forms. This changed condition can be effected in less than thirty minutes. It is going on in every slasher room with greater or less intensity according to conditions prevailing in the plant.

The effect of lessening the body or viscosity by destroying these skeletal forms is that less size is taken up by the yarn and less is retained after the yarn passes the squeeze rollers. Every slasher attendant recognizes the effect of the running down of his size. At frequent intervals he passes his fingers between the opening threads at the lease rods. The difference in the adhesive bond between adjoining threads is immediately apparent. When there is an evidence of insufficient size on the yarn he tries to restore the desired condition by adding a fresh lot of size which has not become vitiated. It is evident, therefore, that conditions are constantly changing and at no two periods is the size exactly the same. A greater or less amount is obviously put on different parts of the warp, due in part to there being strong size in the size box at some times and weak size at others, due also to the variations in the amount (volume) of size in the size box.

It will be seen from the foregoing that an ideal condition would be constant level (volume) of size in the size box and a continuous renewal with strong size that would maintain a uniform consistency every hour of the day.

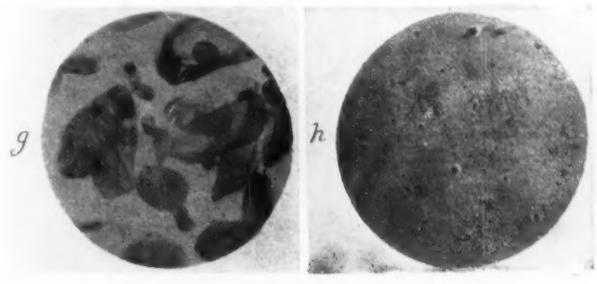


FIG. 1

Microscopic views of starch size solutions of the same percentage strength. *g* shows suspended skeleton forms left after soluble portion has gone into solution. *h* shows solution of starch which has been agitated sufficiently to break up the skeletal forms.

This requires a continuous addition of prime size equal to or preferably in excess of the requirements of the yarn passing through the size box. Inasmuch as the rate of travel is subject to many variations due to stoppage to change beams, slowing down or speeding up after breakouts, laying in a set, etc., it has been impossible so to regulate the stream of size as to meet these variations. To overcome this some mills have tried float valves. These are described at some length in the excellent book "Chemistry and Practice of Sizing," by Bean and Scarisbrick.

FLOAT VALVES

Floats actuating the valve on the size supply line have proved troublesome. The advantage of constant volume is freely admitted but objection is made where so many moving parts that may get out of order are required. Either the valve works too hard and will not give a constant volume, or if working freely it will allow size to leak around the valve, which will finally gum up and prove unworkable. So most mills have felt compelled to depend upon the hit or miss plan of adding new size from time to time whenever the slasher tender found a change in the amount or character of the sizing necessary.

SIZE LEVEL CONTROL

A simple and thoroughly efficient means for controlling the level or volume of size has been recently patented and is on the market. This device, without the use of float valve or moving mechanism of any kind, successfully maintains a constant level of size in the size box. The size level control is made in several forms, one of which consists of a rectangular bronze box which is attached to the end of size box and has two compartments, one of which connects to the size box on or just above the floor. Between the two compartments is an adjustable gate enabling the operator to maintain any desired depth of size. The second compartment is connected through valves and pipe to the size storage kettle.

A special feed device is attached to the supply line, giving a constant stream of size gauged according to the particular requirements of the slasher, but sending constantly an excess of fresh boiling hot size to the size box. The excess above the requirements flows through the constant level control and is sent to a size storage kettle. Thus at every hour in the day there is maintained, not only the same volume, but equally fresh size, assuring absolutely uniform sizing. Incidentally, since the excess of size is taken from the floor of the size box, lumps caused by congealing in cold corners of the size box are automatically removed and prevented from causing hard sized spots. Less rapid but similar constructive changes are going on with greater or less intensity in every mill.

From what has been previously pointed out relative to causes of deterioration of starch size solutions, measures for securing full service from starch in sizing must go back of size box and include the proper preparation and handling of size. In many starches, not well made or purified, there will be found agglomeration of starch grains, held together by impurities, gluten, or cellular tissue.

Unless every granule of starch is separated from its neighbor a uniform solution, free from lumps, cannot be secured. It is therefore advisable to agitate the starch very thoroughly, violently in fact, while slowly heating to boiling, continuing the boiling until the whole mass has come to solution temperature.

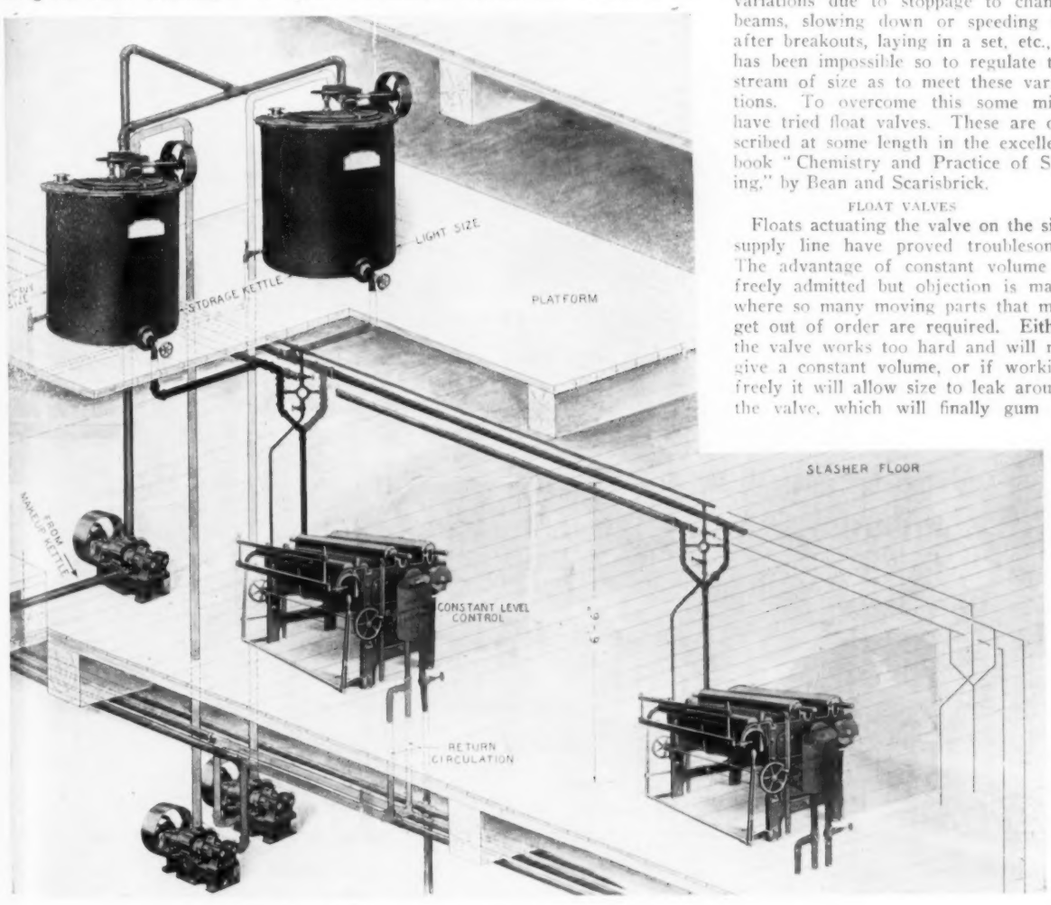
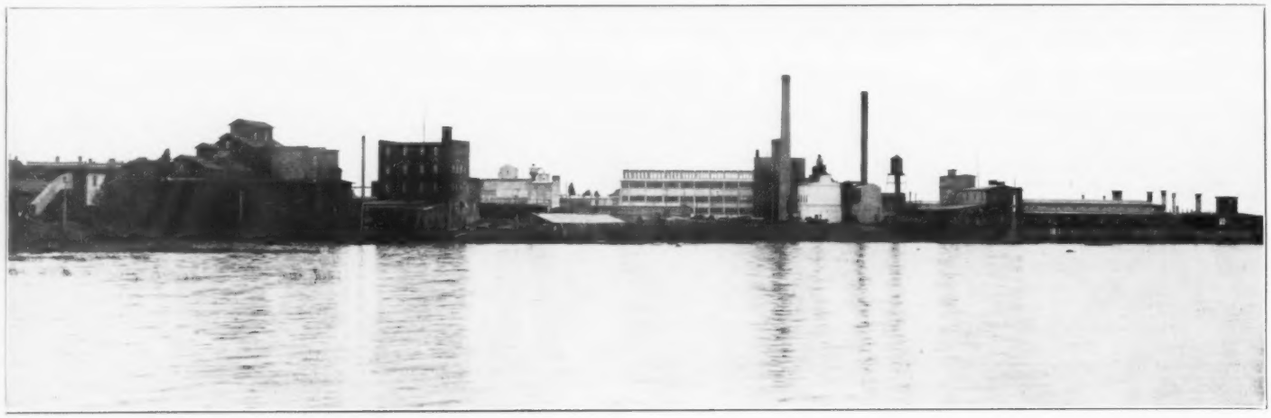


FIG. 2—IMPROVED METHOD OF HANDLING SIZE SOLUTIONS



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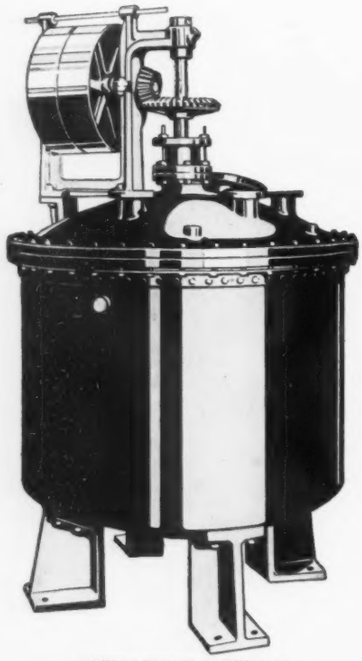

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Having brought the solution to a thorough boil it should be sent through a strainer to a storage kettle from which the several slashers are supplied. In this kettle the agitation should be reduced just enough to maintain a uniform temperature, as unnecessary agitation is injurious. This kettle should be steam-jacketed or insulated. All starch solutions undergo change on standing, which lessens their sizing value. It is, therefore, advantageous to supply several slashers from one kettle, as by so doing the size is used up while in prime condition.

SIZE CIRCULATION

To avoid lumps caused by congealing of cooled size, many mills pump the size constantly from the kettle in which it is made through a loop of pipe extending over the slashers and back to the kettle. While this is better than allowing the size to congeal in the pipe when not flowing, it is faulty in that the pump usually handles a kettle of size in from three to five minutes. The size is, therefore, subject to violent agitation which takes away from its body. One often hears the expression "the life has all been pumped out of the size." This is actually the case; the size has been deteriorated. It not only lacks its original value but from this cause alone the last of the kettle is very much inferior to the first portion. The size should be sent to a storage or supply kettle and from there flow by gravity in a continuous stream.

The illustration on page 125 shows the plan employed in a number of mills, including the new Naumkeag mill, where the constant level device above referred to has been installed. Circulation of size in this arrangement is by gravity and is continuously adding new prime size either light or heavy from kettles marked "light size" or "heavy size." Any slasher on the line can be changed from light to heavy sizing work in a few minutes.

VALUE OF UNIFORM SIZING

Uniformity of sizing is essential to maximum production from the looms. It will be conceded by everyone familiar with the work that the amount of size on the warp influences the ease of running in the loom, and that too much and too little, giving an average, is not equal to a uniform sizing. It is also evident that the best degree of humidity is not the same if one cut on a warp is heavily sized and the adjoining cut is two or three per cent. lighter. Whether a heavy, thick boiling or a thin boiling size is wanted, whether light or heavy sizing should be applied, must be determined by the character of the work in hand, but having been determined the securing of greatest service from the size requires care in the preparation and such a handling as will avoid unnecessary deterioration.

Uniform maximum results require every aid. Several treatises have been published on the art and practice of sizing. None to the writer's knowledge have pointed out that the end sought may be defeated by the improper use of the very machinery or process primarily designed to aid them.

Aniline Plant of Chicago-Kenosha Hosiery Co.

[The enterprise of the Chicago-Kenosha Hosiery Co., manufacturers of "Black Cat" hosiery, in establishing an aniline plant is of interest to the whole textile trade. Through Roger N. Kimball, secretary of the company, we have received the following information which is the first account of their experiences and description of their plant to be published:

IN the type of apparatus used the operation of the nitrating apparatus is as follows: 1,825 pounds of benzol are run into the nitrating vessel, cooling water is turned on, both in jacket pipes and condenser, the stirring apparatus started in motion, and then 5,500 pounds of mixed acid are run in at a speed that requires about eight hours to run in the 5,500 pounds. The temperature should be kept as near 30° C. as possible. If the temperature rises above that the rate at which the acid is being run in should be lessened. If the temperature runs below 25° C., the amount of water running through the jacket should be cut down.

The acid should be run in through a pipe of such size that it will not allow more than 5,500 pounds to run in inside of the eight hour limit. After the last acid is run in, the cooling water is shut off and the acid allowed to settle, which takes about one hour. This acid has a whitish translucent look and can be drawn off directly into acid tanks to be used in other operations. The change from acid to nitrobenzol is very plain, the nitrobenzol being clear and yellowish in color and distinctly different in appearance from the acid.

The nitrobenzol is transferred to the wooden washing tank, which should have one-quarter of its depth with

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Model 329
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Some of the important features of these instruments are their adaptability for use on D. C. or A. C. Circuits of any commercial frequency; the uniformity of the scales; the effective shielding from external magnetic influences and the perfect damping.

The usefulness of the Testing Instrument also extends into the power plant and affords a means of testing switchboard instruments, generators, etc.

Full descriptions are contained in the following bulletins which will be sent upon request: Model 310 Single-Phase and Direct Current Wattmeter and Model 329 Polyphase Wattmeter in Bulletin 2002; Model 370 A. C. and D. C. Ammeter in Bulletin 2003; and Model 341 A. C. and D. C. Voltmeter in Bulletin 2004.

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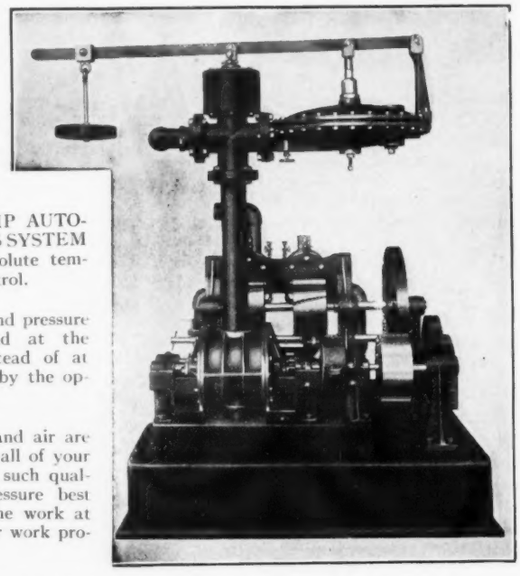

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water. It is then thoroughly stirred and additional water run in up to the top. The stirring is then stopped, the nitrobenzol allowed to settle, the water drawn off by the plugs provided, from above the nitrobenzol, the tank again filled with water, stirred as before, allowed to settle and drawn off from the bottom of the water. The wash water from the nitrobenzol washing is of no use and can be thrown away.

In the nitration of benzol only two precautions are necessary; first, not to run in the acid too quickly, as in that case too much heat is generated, and in addition dinitrobenzol is formed; second, to see that enough cooling water is used to keep the heat of reaction down, as benzol will spontaneously ignite if the heat of reaction gets too high. If when running in the ordinary manner the heat is seen to rise unduly, the safest way is always to shut off the acid, as there may be a possibility that something has happened to the stirring apparatus.

REDUCTION APPARATUS

In the reduction apparatus 1,250 pounds of nitrobenzol are run in together with 2,000 pounds of water and 125 pounds of hydrochloric acid of commercial strength, which is about 37 per cent. The agitator is started and they are thoroughly mixed; then steam is admitted through the pipe provided for that purpose until the leg of the return condenser is as hot as the hand can bear. The addition of iron filings is then commenced, this addition being so regulated that about eight hours are taken to add 1,875 pounds of iron, the iron being 14 mesh fine. This iron, in addition to being fine, should be free from grease.

As the iron filings are added, the heat of reaction should keep the pipe leading to the condenser hot. If for any reason it cools off steam can be admitted; if on the other hand, it becomes too hot and the condenser is not taking care of it, the amount of filings added should be reduced until the temperature is continual, the additional stream of vapor coming off from the vessel, being condensed and returned. The pipe can be tapped off for takng samples. After all the iron filings have been added, steam is turned into the vessel in order to keep sufficient heat to keep the pipe leading to the condenser hot and when a sample taken from the condensed water shows that the water is clear without a trace of yellow, the pipe leading to the main condenser is opened, more steam is turned on and the aniline is distilled off with a current of steam. This can be done as quickly as the condenser will allow it to be done, condensing just as fast as possible without having uncondensed vapors coming over.

The distilling is kept up until the water comes perfectly clear without any trace of milkiness whatever. The condensed material is run into the large iron settling tank where the aniline settles to the bottom and the water goes to the top. The aniline is drawn off from the bottom, provision being made for a small settling pocket to hold any iron that might be mechanically taken over, the draw cock being just off the bottom, and the water from the top is drawn off and used for a subsequent reduction process.

The only precaution necessary in the operation of the reduction vessel is to see that the iron is added evenly, does not clump, and the stirring apparatus is in good working order, and in addition and above all, to see that the return condenser is working properly, as the only danger in a reduction vessel is allowing the material to get practically dry. In this case, violent explosions have been known to occur. The iron oxide and water left in the aniline tank is useless and may be run on the dump or sent to an iron foundry for use.

It is not necessary at the present state of the market where benzol is as pure as it is now, to redistill, and if there should be a little bit of iron combined it can be filtered off and the aniline used direct. The proportions given, both for the nitrating and the reduction are full batches; smaller batches, using the proportions named can be made, provided in the case of nitration the benzol used fully covers the first propeller or stirring blade.

DIFFICULTIES IN OPERATION

In the actual operation of their plant the Chicago-Kenosha Hosiery Co. have met some difficulties. It is their opinion that the American apparatus needs to be re-designed. Stirrers in the nitrator are not designed so as to give them exactly the stirring action required and they have had some little trouble with the chemical action starting very violently when the material reached the second blades. They have also had trouble with the reducer in that the opening for putting in the iron borings was so situated that the borings landed on the spider that held the stirrers. This gradually accumulated and then dropped into the nitrobenzol and ran the temperature up and caused some trouble. This, however, they have been able to eliminate.

They also found it necessary to increase their condensing capacity over what was originally figured. They have been delayed some in getting the apparatus necessary for the handling of their raw materials so that the operation has been more or less spasmodic. They are, however, turning out between 4,000 and 5,000 pounds of aniline oil per week.

Their first runs were not up to what they should have been theoretically. At the end of December they got within 5 per cent. of the theoretical yields, which is understood to be as good as anyone else has been able to obtain commercially.

Manufacture of Absorbent Cotton

By Dr. Louis J. Matos, New York City

BY the term absorbent cotton is meant raw cotton, either bleached or unbleached, that has been deprived of all foreign matters, such as oil, waxes and mineral salts, and which thereby is given the property of rapidly absorbing great quantities of water. In a restricted sense the term is applied to that particular kind of cotton that is used by surgeons as an absorbent and dressing, and with which we are most familiar. This cotton is generally sold in sealed or unsealed packages of various sizes, some brands of which have been rendered aseptic by being sterilized.

There are other forms of cotton that are also absorbent, but not made use of by surgeons, but are employed very largely in the manufacture of so-called soluble cotton for the preparation of pyroxylene varnishes, artificial silk, collodium, etc. Absorbent cotton proper, such as is intended for surgical use must possess certain properties which are specifically prescribed in the United States Pharmacopoeia, as follows, under the head of "Purified Cotton":

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and slightly thickened at the edges; inodorous and tasteless; insoluble in ordinary solvents, but soluble in an ammoniacal solution of cupric oxide.

"When purified cotton, previously compressed in the hand, is thrown on the surface of cold water, it should readily absorb the latter and sink, and the water should not acquire an acid or an alkaline reaction (evidence of proper purification and absence of fatty matter).

"Purified cotton should be perfectly free from all visible impurities, and on combustion should not leave more than 0.3 per cent. of ash."

Briefly the preparation of absorbent cotton consists in giving the stock a suitable alkaline boil, then bleaching and afterwards souring, these several operations, divided by very thorough washings which are necessary in view of the U. S. P. requirements. The finest grades of raw cotton are not entirely suited for this purpose; the Sea Island cotton, owing to its great length of fiber, is extremely difficult to render absorbent. Certain other grades have too woolly a character and owing to the nature of certain coloring matters found in some other kinds of cotton, they cannot well be bleached. The stock best suited appears to be the middling grades of Allen seed, New Orleans, Texas, Mobile, and benders. In selecting the stock care should be exercised that no seed hulls are present, for the reason that fibers with fragments of hulls attached cannot be properly acted upon by the chemicals. In this connection it should be noted that cotton can be bleached without taking on water absorbing properties; on the other hand it may be made absorbent without being bleached. The details of the chemical treatment for preparing absorbent cotton are as follows:

The cotton is loaded into a kier where it is thoroughly wetted out by circulating boiling water for several hours, which causes the removal of a considerable portion of soluble impurities and at the same time preparing the non-soluble impurities for the hydrolyzing action of a 1 per cent. solution of caustic soda, which is circulated for twelve hours under low pressure, thereby completely saponifying the fatty and waxy bodies present, together with pectose, a substance always found in raw cotton. The saponification of these substances must be complete, for if traces remain, the cotton will not be absolutely and fully absorbent.

It is possible to shorten the time of this boiling to four or five hours if the pressure in the kier is increased, but as a rule more uniform results obtain if the longer time is given. After the soda boil, the liquor is run off and the cotton given a fairly good washing, sufficient at least to reduce the temperature to normal.

The cotton is now ready for the bleach, which may be done either in the kier by circulation of the liquors through the mass of cotton or by removing the cotton to large woolen circular or oval shaped vats, similar to pulp beaters, in which the bleaching is carried out. The strength of the bleach solution should be about 1 per cent. of chlorine and the bleaching should proceed to the limit, the bleach bath at the end of the run showing but little available chlorine. As a matter of fact, cotton being bleached for absorbent purposes is in reality partially oxidized or over bleached and responds promptly to the oxy-cellulose reaction with methylene blue.

Two different bleach solutions may be used, one prepared directly from bleaching powder, the other being a solution of hypochloride of soda, and may be obtained either by decomposing bleaching lime, or by electrolyzing a solution of common salt. These different bleaching solutions will be considered further on.

After the bleaching has been done sufficiently, the cotton is well washed in plenty of water and afterwards soured with a 1 per cent. solution of muriatic acid, washed again and the whole mass of cotton subjected to a light boil with a ¼ per cent. solution of caustic soda, again rinsed and treated to a second sour, the purpose of which is to remove as much as possible the remaining traces of mineral matters, and washed again thoroughly. To remove the possibility of any chlorine odor remaining in the cotton, it is well soaked with a weak solution of anti-chlor, followed by a good wash. Opinions differ as to the anti-chlorine treatment. Some manufacturers prefer to give a final light soap wash, which leaves the cotton very soft, but unless all previous washes with plain water have been effective, so that no chlorine remains, it is best to omit the use of soap. From the preceding, it will be observed that the idea of the manufacturer is to produce an absolutely pure white cotton, which may contain small quantities of oxy-cellulose.

Regarding the bleach, a solution of chloride lime is commonly used, but where an absorbent cotton of special softness is desired, bleaching lime must not be used, as it is difficult to wash out, and also because it is the usual habit of bleachers to sour with oil of vitriol, a bad practice, as it forms at once sulphate of calcium on the fibers, which is impossible to remove. The presence of it causes the cotton to have a harsh feel. On the other hand, where sodium hypochlorite is used, no lime salts are present and the residual soda salts are readily washed out, irrespective of whether the sour is oil of vitriol or muriatic acid. Hypochlorite of soda is rapidly gaining favor with bleachers, not only on account of the above mentioned reasons, but on account of its uniformity.

Sodium hypochlorite is prepared from bleaching powder in the following manner:

Bleaching Powder	lbs.	500
Water	gals.	250

Work into a thick cream or paste by stirring, taking care to break all lumps.

Prepare a second solution by dissolving

Soda Ash	lbs.	300
Water	gals.	125

Boil by blowing steam through and add

Water	gals.	60

The soda ash solution is now poured into the bleaching powder solution. The whole is well mixed for some time and allowed to settle, and the clear liquid drawn off without disturbing the sediment. This sediment is washed with several changes of water, allowing to settle after each wash, when it is drawn off and added to the main volume of the bleach, thus diluting it until it stands at 6 degrees or 7 degrees Tw., and yielding a total volume of about 900 gallons. To it is added 10 pounds of soda ash dissolved in a small amount of water, which will precipitate all remaining traces of lime. This solution is then ready for use as a stock liquor, and may have to be diluted for actual bleaching.

The electrolytic bleach is strictly a solution of hypochlorite of soda obtained by passing a current of electricity through a solution of common salt contained in a suitable apparatus, called an electrolyzer. This method of making bleach solutions is of great importance, and is ultimately destined to displace the use of bleaching lime. After the cotton has been bleached and washed and freed from all impurities, it is dried and packed in a large steril-

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WORKS:

Schoellkopf Aniline & Chemical Works, Inc.

BUFFALO, N. Y.

ANDREYKOVICZ & DUNK, Inc.

Dyestuffs

ANILINE COLORS

Chemicals

58 & 60 N. Front Street,

PHILADELPHIA, PA.

Philadelphia Representatives Sandoz Chemical Works, Basle, Switzerland

izing drum, where it is saturated with the vapors of formaldehyde.

It is not the purpose of the present article to discuss the subject of antiseptic dressings, but these consist of cotton that has been treated with various medicaments, such as carbolic acid, corrosive sublimate, iodoform, boric acid, etc. From the foregoing it will be seen that the most essential features of the entire process consist of a thorough alkaline boil, followed by a good rinse, then a bleach in a bath containing sufficient active chlorine to ensure the presence of oxy-cellulose, then a wash, followed by a sour to break up the remaining traces of the bleach.

With these operations conscientiously carried out, giving due regard to the washings, the manufacturer may have no fear of not complying with the official requirements.

Well made absorbent cotton should have the property of taking up from 18 to 20 times its own weight of water, and the way to determine this is to weigh out exactly 5 parts of the sample (absolutely dry) and immerse it for 5 minutes in pure water, remove carefully without excessive squeezing, and place in a small weighed funnel and allow to drain under slight pressure, and again weigh. Deduct the weight of the funnel from the combined weight of the funnel and the wet cotton, and divide by 5, the result will be the amount of water absorbed, in multiples of the original weight of cotton taken.

ENGLISH COLOR MAKING

(*Continued from page* 123)

Technical Committee, Doctors M. O. Forster, J. C. Cain and G. T. Morgan.

Upon an Advisory Council of which the late Professor Raphael Meldola was chairman, there are thirteen professors, exclusive of A. G. Green, J. F. Thorpe and the two sons of W. H. Perkin, the discoverer, in 1856, of the original aniline mauve. When the high experts have pronounced opinion, much necessarily remains to the discretion of the works chemists who have responsibility for the technical success, and whose views on chemistry and manufacturing are partly formed during the night, when they turn out to see how the "melt" is behaving, and on the Sundays on which the expert does no work. It is common enough to hear of variations of opinion between scientific and commercial chiefs and it is not inadvisable to know that the theorist and the works man have their differences, although it is by no means suggested that in the operation of British Dyes, Ltd., any irreconcilable differences have arisen.

Factories for making nitro-compounds have sprung up in all parts of the country and one such, that will eventually devote attention to colors, has been begun in Huddersfield, by Major Lionel B. Holliday, on a site adjoining the new works of British Dyes. A large area has been secured with rail and water transport and the new enterprise is likely to become important in the course of time. Huddersfield is now definitely the hub of the British color trade and in a relatively small way it has been a producer of tar colors for fifty years. The late Mr. Dan Dawson was the first to take up Perkin's discovery and the works at Milnsbridge, Huddersfield, founded by him, are operated as nitro-compound works by Mr. J. W. Leitch. The youngest brother of Dawson is still in the trade with J. Robinson & Co., Ltd., Hillhouse Lane, Huddersfield, a concern founded in 1840, which has an output of 40 to 80 tons of sulphur and other colors per week. The Colne Vale Dye & Chemical Company, Milnsbridge, Huddersfield, is a smaller and newer concern.

DIFFICULTIES OF EXPANSION

Had there been fewer difficulties in the supply of materials there would almost certainly have been larger accessions to the number of color manufacturers. Conceivably the great dyeing combines would have taken steps to manufacture for themselves. The Bradford Dyers' Association, which has for many years operated a chemical works at Low Moor, has followed the prevailing fashion and founded, not a color-making branch, but the Low Moor Munitions Co., Ltd., with a nominal capital of $250,000. At least one other dyers' combine includes a drysaltery branch for the supply of woods and chemicals, but neither has this undertaking ventured upon the manufacture of tar. Levinsteins, Ltd., of Manchester, have largely increased their output and their profits. The Yorkshire Dyeware & Chemical Co., of Leeds, has added to its productive power. The Clayton Aniline Co., of Manchester, an offshot of the Society of Chemical Industry of Basle, has enlarged its plant. The British Alizarine Co., Ltd., of Silvertown, continues to make its alizarine colors. Apparently this lists exhausts the names of those who have produced any appreciable amounts of tar color hitherto. A number of people are known to be looking forward to making colors ultimately, and the color-making stage has been reached by Harding McMyn & Co., Ltd., Baxenden, Accrington. How those will fare who have hitherto only got to the stage of making benzol and toluol remains to be seen. There is a distinct probability that the manufacture of the cheap and simple colors will eventually be overdone and this prospect would help to explain the known intention of some of the older firms to push on to more advanced products as soon as circumstances will allow.

TEXTILE ALLIANCE AND WOOL

(*Continued from page* 50)

Association of America to represent that organization on the Alliance, thus making five trade bodies which were associated in the organization.

ORIGINAL DYESTUFF ACTIVITY

By reason of its intimate relation to the dyestuff distribution in this country it was not at all strange that when the war broke out the Alliance should be interested in an endeavor to solve the problem of dyestuff shipments to this country. Thus, early in January the efforts of counsel for the Alliance to make an arrangement with the British government by which it would allow dyestuffs to be shipped to this country without interference was noted in official government correspondence. The intimate acquaintance which was formed with British officials in this endeavor brought the Textile Alliance to the notice of authorities in that country and when the matter of allowing shipments of wool to come to America was before them it was equally reasonable that they should appreciate the necessity of having some centralized and responsible organization which they could hold accountable for the disposition of such quantities of wool as they should allow this country to have. Possibly the attitude of the British officials toward the Textile Alliance was based on a slight misconception at first. It was evident that it was believed this organization resembled very closely the amalgamation of textile associations such as were known in Great Britain, as, for example, the International Federation of Master Cotton Spinners and Doublers which has been behind notable improvements in the conduct of the cotton manufacturing industry throughout Europe. Whatever may have been in the minds of those in authority they realized that the personnel of the directors of the association represented a wide range of manufacturing interests and that it would be possible to hold the members of the associations represented in this organization responsible for the proper conduct of the wool exporting business. Therefore, it was agreed that an arrangement would be entered into with the Textile Alliance by which merino wool would be sent to this country with satisfactory assurances that it would not be reshipped abroad. And in this manner the Textile Alliance became the instrument by which the wool manufacturing industry of this country was enabled to receive its raw material instead of being compelled to shut down mills as the result of its non-receipt.

REASONS FOR OPPOSITION

When the plan by which the business of importing wool into this country was first broached a good deal of opposition on the part of important factors in the manufacturing and importing divisions of the industry was engendered. The argument was advanced that England had no right or license to say how American manufacturers were to conduct their business, that there should be no restrictions as to whom they should sell and above all no charge for bringing wool into this country beyond the ordinary shipping, insurance and other legitimate expenses. Meetings were held in New York and Boston at which the plan was roundly denounced and threatened appeals to the Government were reported as likely to prevent the consummation of arrangements. Gradually, however, it was realized that if manufacturers were to secure their raw material and operate their machinery they would have to accede to the demands of the power that controlled the disposition of a very large proportion of this raw material by reason of the fact that it is the product of British colonies. Therefore, although acquiescence to the details of the arrangement came hard on the part of important factors, opposition gradually lessened and agreement to the plan, somewhat modified from the original outline, was entered into. Of course, there have been certain modifications brought about by development of conditions since the first announcement of the plan, but for several months the operation of the Alliance has proceeded smoothly and satisfactorily, not only to manufacturers and dealers in this country but evidently to British authorities.

DETAILS OF THE PLAN

Arrangements for the exportation of merino wool from the British Empire to the United States were made in February and March, 1915, and have from time to time been extended to include in addition tops, noils, yarn, wool waste, camel's hair tops and noils, angora goat hair, mohair, flannelette raisings, wooled and haired skins of sheep and goats. The purpose of the British government as stated in a letter to the Board of Trade was "to obviate the serious injury to American industry and the American consumer that must have resulted from the total prohibition by the several British governments of the export of wool to all foreign destinations (including the United States)—a prohibition which those Governments would be perfectly entitled to enforce, did the requirements, military and other, of the allied governments appear to them to warrant such a course. The great importance of this staple to the Allies and the equally great importance of withholding supplies of it from their enemies would render impracticable wool shipments to neutral countries like the United States, even for the internal consumption of these countries, except under the most stringent safeguards, and these safeguards have in the board's opinion so far been most satisfactorily provided by the agreement with the Textile Alliance."

On Feb. 12, 1915, the Textile Alliance entered into the following arrangement, and the details of this arrangement, which at that time applied only to merino wool, have been applied since on other commodities above specified. The Alliance agreed that

"1. Neither the Textile Alliance, nor any of its associated bodies, nor their members, the owners of mills for whom the wool is destined, shall re-sell any British wool imported to any dealer or other person or persons, but such wool shall be used in the mill or mills for their own manufacturing purposes only.

"2. No part of the wool, nor any wool tops or yarn made therefrom shall be re-exported to any destination from the United States of America.

"3. Realizing that such imports might encourage the export of American-grown wool, the Alliance would so far as lies in their power, endeavor to discourage the export of such wool.

"4. With the advice and consent of His Britannic Majesty's Ambassador at Washington, the Alliance would take such measures with the several purchasers and importers as would best effectuate this undertaking."

Details of this agreement have since been modified to permit shipments of tops and yarns to Great Britain, British dominions, France, Russia, Japan and Italy, and wool, tops and yarns to Canada. It was not thought at the time the original agreement was entered into that there would be any necessity or even chance of exporting wools or manufactures thereof, but conditions in England made it possible to trade with these countries and hence the modification. The Alliance, in order to preserve the relations existing between England and the United States, has urged those who have obtained licenses under its plan to refrain not only from transactions that may be open to criticism but also to use their influence to dissuade others from such transactions. Wool, tops and yarns are absolute contraband, and shipment of these from the United States, except under regulations relating to such shipments by the Alliance, have been stated by the British authorities to be liable to be regarded with suspicion and to be made the subject of prize court proceedings.

MATTERS OF SHIPMENT AND CHARGES

The granting of licenses and permits to ship rests solely with the British Government and the Colonial Governments. The Alliance simply recommends and the permits are granted only insofar as the requirements of Great Britain and its allies may permit. It further makes plain that the granting of licenses does not assure that the merchandise is certain to be released upon arrival in the United States. After the shipments have been made and as soon as details are available the importer is obliged to forward to the Textile Alliance a guarantee by the purchaser. This guarantee comprehends not only a promise that wools will not be re-exported but a requirement that when sales are made by dealer to a dealer both parties shall be members of the Textile Alliance, or one of its associate bodies, and that the seller of any licensed importations shall furnish a guarantee from the buyer on an approved form that the latter on his part will not dispose of his purchases to anyone by whom there is any possibility that the wool shall be re-exported

(*Continued on page* 149)

Late Improvement in Wool Manufacturing Situation

Interesting Year in Men's Wear

Woolens Have Lead Over Worsteds on Comparative Basis

A YEAR crowded with difficulties and perplexities for men's wear selling agents and mills has been the record of 1915. Never before has the trade been called upon to face situations so unprecedented, and at times so critical, as those which have presented themselves from time to time during the year. Immediately after the war began in August, 1914, a famine in dyestuffs was threatened, and, as a consequence, while the clothier was anxious to cover his wants as early in the season as possible, the selling agent was loath to accept all the business offered, not knowing how far his mill could go in the matter of deliveries. When heavy-weights were opened late in January, prices showed a marked advance over the previous season. Buying was heavy and further advances were made almost immediately. This did not deter clothiers, who in many instances overbought, especially those usually dealing in foreign fabrics, and the result was heavy cancellation after purchases had been revised. Foreign men's wear fabrics, imported from England during the last half of 1914 were not entirely exhausted, and naturally cut some figure in the market during the year's early months.

RAW MATERIAL SITUATION

Stocks of wool of all descriptions were getting low and there was little hope that England would raise the various embargoes imposed at the beginning of the war until the Textile Alliance, Inc., succeeded in putting a plan into effect whereby England allowed certain wools unsuitable for army goods to come here under license. This relieved the situation so far as Australian fine wools were concerned almost at once, but it was not until later in the year that crossbreds were released. A limit was put on these, so that up to the end of the year only a nominal amount was landed. The "Alliance" plan extended to the Colonies, and was the means whereby a large amount of Cape Colony wool and mohair was imported direct.

While the wool situation improved, the dyestuffs shortage continued to trouble manufacturers and is still doing so. Mills, in some instances, resorted to logwood dyes with more or less success, and openly stated the fact of the substitution to the trade. Other mills in styling lines for the spring, 1916, season were obliged to confine their work to the limited number of colors on which they were covered.

YEAR'S OPENINGS ARE STRONG

At the time spring goods were opened in July, quoted prices showed an advance of from 20 to 22½c. a yard on serges which employed quarter-blood wool, while staples made from the low-grade Australians were about on the same basis as the year previous. A noticeable feature of the opening was the absence of fabrics with silk noil decoration, this commodity being unusually high and scarce, owing to the inability of obtaining it from abroad. A large advance sale of serges took place previous to the regular opening, so that for some time serges moved slowly at the new price.

Near the close of the year, or about September, there arose a strong demand for overcoatings, and in a short time all available spot stocks were cleaned out, and some buyers even went so far as to purchase cloakings in rough mixtures for men's wear overcoatings. When the time arrived for selling agents to present heavy-weight fabrics for fall, 1916, the complications were many, and, while wool was plentiful, the question of dyes came up with a more serious aspect than in the light-weight season. Advances of 40c. a yard over the previous year were quoted on mixture wool overcoatings owing to the increased cost of raw material, and heavy suitings were proportionately high. Buyers, however, were determined to have merchandise, and it was rumored in the market that orders had been placed for as quick delivery as possible for use in the fall of 1916. Some mills accepted these orders, while others declined them, preferring to wait for the usual openings before selling up production. A few mills, however, had just completed certain war contracts, and were in need of immediate business to keep machinery moving, and to these this advance business was welcome, as no further war orders were in sight at the time. During the entire year woolen machinery has been busy, but it has been estimated that only 30 per cent. of the worsted machinery has been running. Foreign orders were, in a measure, responsible for a large part of the activity in woolen mills.

YEAR'S GOOD RESULTS

While the year has been a trying one in many ways for the industry, it has brought its compensation in that the conditions which have prevailed have taught the manufacturing trade some valuable lessons and clothiers have come to realize the fact that they must expect to pay more for merchandise and abandon their old method of trading down on fabrics, which has been one of the greatest evils in the piece goods trade. The year has also developed the strongest seller's market in the history of the industry, and it is now up to the mills to pursue the proper course and keep some of the advantages that have been gained. The profitable business which has come to the woolen industry during the year, however, is due entirely to the war, without which mills would have been obliged to close.

BANNER WOOLEN YEAR

Woolens have held precedence over worsteds all through the year, even during the light-weight seasons when worsteds are supposed to sell best. The difference in price has of course had much to do with it, and it has been easier for woolen manufacturers than for the worsted mills to manipulate their fabrics to keep them within the price limit of the manufacturing clothier in his trading down policy. This was demonstrated in the early part of 1915, when duplicate orders began to come in from these factors, for goods to be cut up into light-weight clothing, and continued throughout the heavy-weight season. At the present time, low priced woolens have received by far the largest duplicate business.

Aside from the fact that manipulation is an aid to woolen manufacturers

(*Continued on page* 141)

Dress Goods Improve Under Difficulties

Year Brings Anxieties but Buying is Good—Cloaking a Feature

CONDITIONS governing the dress-goods division of the woolen industry during the year 1915 were as complicated and troublesome as those which men's wear selling agents had to face, and, while the year, as a whole, has proved to be a remarkable one in many respects, the good volume of business transacted has been accomplished under a strain from beginning to end. Uncertainty as to raw materials, especially dyes, and the prospect of a famine in this direction, caused the trade no little trouble during the first few months of the year, and, when lines of dress goods were opened by the big corporations in January, sharp advances were noted in the prices then announced over those of the previous season. These prices were followed up with further advances almost immediately, and many lines were placed at value or withdrawn. Colors in the various fabrics ran to black-and-white effects largely, and fancy shades were conspicuous by their absence. Some of the large houses made an attempt to substitute fugitive colors, but after many pieces had been rejected by the cutting-up trade on this account, the attempt to use these dyes was abandoned and fast dyes used as far as possible throughout the year. In the meantime, the wool question was also a source of worry to the manufacturers, and fine stock in imported wool was rapidly disappearing when, through the efforts of the Textile Alliance, fine wools began to arrive from the other side, which relieved the situation, and for the balance of the year, while prices remained high, the supply was sufficient for all needs.

EXPORTATION OF DRESS GOODS

Immediately after the usual dull period in April, a heavy demand developed for dress goods from European countries, and up to the present time has continued to grow, thereby keeping many mills in operation which might have been idle if domestic business alone had made demands on them. Canada also fell in line as a market for American dress goods, and large quantities of tweeds were sold there. The English mills from which these fabrics had formerly been obtained were unable to take care of the business on account of war demands at home. As the year advanced, serges also were exported to an extent never before known, and few, if any, of the leading makers failed to get their share of this new business.

Domestic trade continued to improve during the last six months of the year, until, near the close of 1915, a larger percentage of dress goods mills were busier than at any time in several years, while prices received by the manufacturers were higher. Taking everything into consideration, and notwithstanding the difficult conditions under which they were obliged to operate, dress goods manufacturers have completed one of the most successful years in their experience.

It must be remembered, however, that this has not been due in any way to naturally improved conditions in this country or to the present tariff, but can be attributed alone to the effects of the great war in Europe.

SERGES MEET A STRONG DEMAND

Serges for women's wear in the early months of 1915, and for some time previous had been more or less neglected and there had been but a slight movement in them compared with normal times, but the prospect of colors giving out evidently spurred garment makers on to stock up on this staple. More especially, perhaps, was this true in the cheaper grades and a strong and active demand began to develop early in the year, which increased gradually up to the close. The export demand for serge appeared about this time and exporting dress goods houses began shipping this fabric to England in large amounts. The first shipment of note was made by a prominent house in May, 2,000 pieces on one order going to England. This export demand had the effect of strengthening the market here, and storm serges were immediately advanced 5c. a yard, and finer qualities in proportion, and cutters-up who had delayed buying were obliged to pay the high figure. The strike threatened by the garment operators had held up the trade for some time during the summer, and as a consequence jobbers and suit-makers refused to take in goods orders and in many instances contracts were canceled. The strike, however, did not materialize, and when these factors were obliged to have the cloth, they found that it could not be obtained at the original figure, and the mills were the gainers after all. At the close of the year serges found themselves in a very strong position with the prospects of a continued popularity during the coming season.

POPLIN DEMAND SPOTTY

Poplins have had a good year throughout and while there have been a few periods when there was a noticeable lull in demand, the year has averaged up to, and perhaps beyond, normal years. Leading makers during these dull periods did not lose their faith in poplins and continued to order the mills to go ahead making them up. Their judgment that poplins would not go out so suddenly proved correct and within a short time the demand returned as strong as ever. The bulk of the business done on this fabric has been in most parts on goods around $1.15 to $1.25 a yard, although a better quality of cloth has had a remarkable sale as well in those sections of the market dealing with the makers of high grade goods.

COVERT OUTLOOK SHIFTING

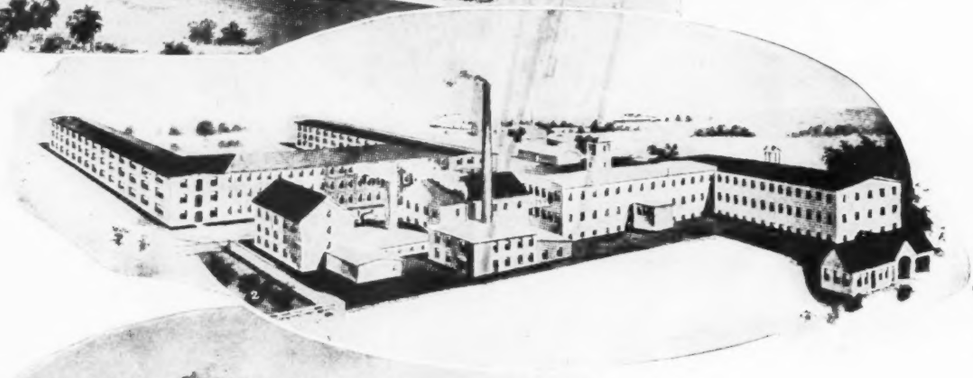
This fabric has had an erratic year and one that can hardly be called successful as a whole. During the beginning of the heavy-weight season there was a more or less strong call for coverts, and some of the leading makers predicted that another period of popularity was due. The demand, however, did not last long at that time, and continued to decrease until jobbers and cutters would not take them in any quantity. Little was heard of coverts from that time on during the next light-weight season until late in the fall there were signs of a revival and at the close of the year their prospects were much improved. At the present time they are stronger than at any time during the year. This fabric is best suited for light-weight wear in the women's field

MILLS OWNED AND OPERATED BY

Joseph E. Fletcher

Fancy Worsteds, Woolens, Piece Dyes, Serges, Mixtures and Mercerized Fabrics in Wool and Worsted for Men's Wear.

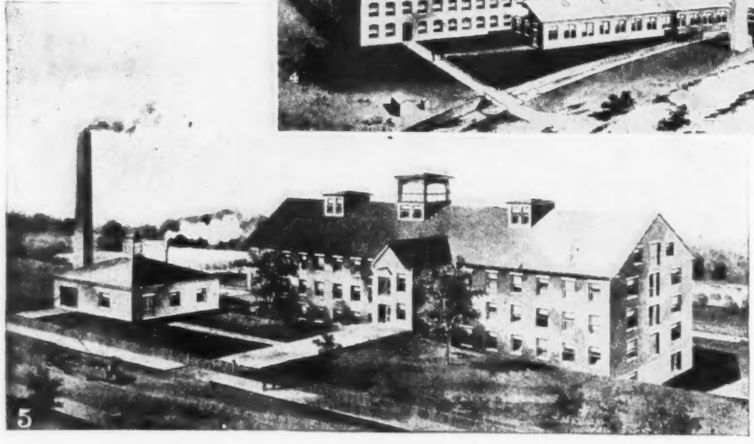
Coronet Worsted Co.
(No. 1 Mill)
Mapleville, R. I.



Coronet Worsted C
(No. 2 Mill)
Mapleville, R. I.

Allenton Woolen Co.
Allenton, R. I.

Plainfield Woolen Co.
Central Village, Conn.



Central Yarn Co.
Central Village, Conn.

Sell Direct

New York Office and Salesroom

Everett Building

45 East Seventeenth Street

E. M. Stout, Sales Manager

and spring trade may be heavier than expected.

SHEPHERD CHECKS

Shepherd checks have met with their usual success during 1915 and in some respects have gained ground. Mills engaged in making this fabric have been busy throughout, and shepherd checks have been styled successfully for the heavy-weight seasons as well as for spring and summer. The staple black and white effects have perhaps sold best as usual, but many lines of illuminated checks have been introduced during the year which have had a large sale for skirts and suits. One line in particular which has attracted attention in the trade is made with a gold overplaid effect, and has been imitated or used as a basis for other similar patterns. One remarkable feature of the continued success of this fabric is the fact that although cheap all cotton imitations have flooded the market, they have had little effect on the high grade all-worsted goods, which are in fact as strong as ever both for men's wear and women's wear. A shepherd check is now numbered among the staples and there is little doubt that they will be found in regular lines indefinitely.

CLOAKINGS AND SPORT COAT MATERIAL

The year 1915 has been a banner year for cloakings and sport coat materials. The idea of the fancy coat, which has been gradually growing for the past few seasons, is still on the increase, helped on particularly this fall by the skating fad which then came into fashion.

Rough mixtures and novelty fabrics are best suited for such garments and consequently mills that can make goods of this description have been busy. The best feature of this business is that it is good all year round, and is not confined to either a heavy or a light-weight season. White chinchillas, which have had a remarkable run of several seasons, seem to be none the less popular now, and as the mills that make them are comparatively few, especially on the high grade goods they have been worked to capacity, and it is not unusual for some of them to be months ahead in deliveries. As the fall approached the demand for men's wear overcoatings was so heavy and merchandise so scarce that the cloaking field was invaded by overcoat manufacturers looking for overcoat material, and in many instances cloakings in extreme styles were taken to fill their needs.

ACCUMULATED STOCKS CLEANED UP

This, combined as it was with the unusually strong demand from the regular cloaking trade, cleaned out spot stocks in short order and long before the season closed it was a difficult matter to find anything in the cloaking line made up or which could be ordered for prompt delivery. Perhaps never before have mills been engaged on heavy cloakings so late in the season as in 1915. Accumulated stocks have rarely been so well cleaned up at big prices as as the present time. In fact it is the belief that many pieces of goods of this nature 3 or 4 years old have lately been disposed of at prices in excess of the original value. It is certain that as soon as cloakings and heavy suitings are opened for fall, 1916, there will be a rush for merchandise. No one is ready at this time to predict what will happen in regard to prices at that time nor can anyone foresee how the many difficulties will be overcome, but it is reasonably certain that the American manufacturers will be equal to the occasion and will meet and surmount all obstacles as they have done during the year just closed.

MEN'S WEAR REVIEW

(*Continued from page 139*)

in the matter of keeping cost of production down, the dye proposition is not the serious matter with woolen that it is with worsted mills, for the reason that a wool yarn takes more readily to a substitute color.

The manufacture of woolens during the year has been distributed among a fewer number of mills than usual, and this fact, together with the advantage in price, is perhaps the main reasons for the heavy business done by mills engaged.

The heavy demands that have been made on the substitute market for stock to make up foreign orders for blankets and uniform cloth has forced prices beyond precedent, and in purchasing stock for manipulated woolen goods domestic mills are now obliged to pay fabulous prices for desirable grades of shoddy and rags. Wool, too, continues to be held at high values, and the consequence was that when wool goods were opened for the fall season, 1916, prices were fixed unusually high. The clothier was prepared for this, as the end of the last heavy-weight season had given him a clue as to what to expect. Merchandise, of all kinds, and more especially overcoatings, were scarce, and late buyers were forced to meet advance over advance. In fact there was insufficient merchandise to go round, and goods that had been in stock for two or three years met with a ready sale at full prices.

WORSTEDS STRIKE MANY SNAGS

Fancy worsted manufacturers have found it much more difficult to merchandise their product during the year than perhaps any other branch of the industry. Everything that handicapped the other branches, such as high cost of raw material and lack of dyes was present with them, and there were many other difficulties besides. The disappointments of the duplicate business on Spring goods at the beginning of the year, were hardly out of mind before the market was flooded with summer cloths, which met generally good sale, and had a tendency to hurt fancy worsteds. In styling for spring, 1916, extreme care was necessary to select styles that the mills could make, but it was found that the price necessary to cover a profit for the mills placed the goods just beyond the limit of clothiers.

This, of course, refers to medium and low-priced fabrics. For instance, a fancy worsted, which in normal times could be sold for $1.25, was put up to $1.37½. The clothier would not pay this figure, and turned his attention to woolens. In order to get the price of this fabric down to the price limit, it was found necessary to employ a certain percentage of cotton or make a lighter weight cloth. The former most mills hesitated to do, as the move would put them at once into the class of cheap cotton worsted manufacturers and it would be a question whether or not they could again get back into the trade with a reputation for high class product. It was easier to make a lighter weight cloth, and this many have done, especially for the present season. It is not an unusual thing to see a 12-ounce fancy worsted as a heavy-weight. There is a chance, however, that the high cost of wool and shoddy will force the woolen mills to so high a level that the gap between woolens and worsteds will not be so great and clothiers will be educated to higher prices and buy worsteds with more freedom.

SERGES ADVANCE IN PRICE

The situation of serge during the year was changeable. At the opening of staples in February sharp advances were noted. The popular 3,192, which is a light-weight serge, showed an advance of 10c. a yard over the previous season. Other well-known numbers were put up in some cases as much as 25c. a yard. Many of the large operators, however, had purchased their requirements long before so that the opening price meant little, and initial buying afterward was light. All the principal factors had accepted the advance business so that in volume it was probably nearly up to normal. Clothiers and tailors to the trade were reported to have carried over considerable stock on account of too free buying last year. For a time it was feared that the many summer cloths put on the market might injure the sale of serge and no doubt they did to a certain extent on the low end goods. When light-weights were opened in July, the advances were even sharper than on the heavy-weights. Again it was reported that large advance sales had been made so that conditions were on a par with the heavy-weight season. What the advances will be for the fall season, 1916, is difficult to forecast, but they are very likely to be radical ones.

Overcoatings have had a strong year all through, and were at their best near the close. Openings in February met with a good reception by buyers and a heavy initial business followed. Duplicate orders were also satisfactory. Toward the end of the season, late in the fall, demand became very insistent and stock goods of all descriptions were cleaned up, while many mills accepted orders up to Dec. 15 delivery. In some instances orders were taken for delivery in the early part of 1916, presumably for future use, although indications were that buyers would take in the goods when made and apply them to the current season. So low did stocks become that women's wear cloakings were taken for men's wear use. The season just closed can safely be called one of the best in years for rough overcoatings. Semi-staples began to move with more freedom late in the fall, and the feeling that they will be more of a factor in the coming year's business than for some time past is prevalent.

Worsted Yarns Tenaciously Bullish

Strength is Market's Chief Characteristic in 1915

AN analysis of the development in worsted yarns during 1915 reveals three prominent factors which dominated the market during its steady advance to the high levels attained at the year's close. Furthermore, these same factors promise to sustain the market for an indefinite period well into 1916. These important influences are: high prices in the world's wool markets, firmly maintained at all times; the growing scarcity of dyestuffs, and the growing sentiment among both spinners and manufacturers that merchandise has a value.

A waiting game was being played as 1914 drew to a close; the heavy-weight season was dragging with extremely limited activity because buyers were, as usual, looking for lower prices. The trade had anticipated that with wools in larger supply, owing to the increased Australian clip, and the decreased demand for finer wools, prices would be lower. Unexpected world-wide demand for wools at advanced prices, in conjunction with England's embargo action, compelled them to alter their views. The promulgation of the embargo, naturally, forced worsted spinners to depend upon American wools. Yarn prices advanced, contrary to general expectations, in the early months of the year, and buyers were forced to meet them. Even after the embargo was lifted on Australian fine wools, the business already done on yarns and goods was sufficient to maintain the advances of January and February.

STRENGTH THE YEAR'S KEYNOTE

Throughout the year worsted yarn prices held firm, in spite of frequent periods of dullness. Stock lots of yarns for a time unsettled prices, but spinners were forced to hold to their quotations on yarns to be made on account of high levels maintained by wool all over the world. Enormous consumption of wool for military purposes, with its consequent total destruction in burned and buried uniforms, blankets, etc., beyond chance of the usual reclamation as shoddy; restricted shipping facilities, embargoes, and rumors of embargoes, all tended to force wool values upward. It was on this ground that spinners based their prices and much of their confidence in the future. Yarns were quoted on a wool price basis, and spinners made every effort to secure advances on a parity with wool costs. Buyers argued, as usual, that yarn prices were too high, but spinners pointed to 1910, when quarter-blood wool sold at 34c., and 2/32s at $1 to $1.05, while in 1915, with the same wool cost, the yarn sold 90 to 92½c. Because of wool conditions, yarn prices were always sensitive, and responded to every buying movement of whatever size. Manufacturers of goods were frequently obliged to advance their prices to meet increased yarn costs. This at first checked operations, but a real need for fabrics soon swept it aside.

Strength shown by the new wool clip was a surprise to many factors who had counted upon recessions. A fair volume of initial business was done on light-weight yarns, and, as duplicate orders on both heavy and light-weight fabrics made their appearance, many spinners were able to show more business on their books than for many years. As an indication of existing conditions, heavy-weight yarns, which were purchased in January, 1915, for fall, were purchased largely last October and November for fall, 1916, three months earlier than the previous year. Many spinners are sold up for months to come, with specifications already given against these contracts, and several spinners have been refusing business offered them. In view of the high cost of medium wools, attention has been directed to half-blood and fine yarns as making up a better fabric at a more advantageous cost. During the early part of the year yarn prices held firmly, on account of the strength of wool, but toward the close, the volume of business was such that yarns stood on their own merits. The year had opened with 2/40s quoted 95c. to $1, and 2/30s half-blood at 90 to 95c.; at the end of the year, 2/40s were held $1.12½ to $1.15, and 2/30s at $1.05 to $1.07½.

MANY TROUBLES IN DYEING

It is generally admitted that had it not been for the scarcity of dyestuffs, business would have reached record figures. This situation has been more serious than was anticipated by both spinners and manufacturers. Mills which had a fair supply of standard aniline dyes on hand complicated matters as buyers endeavored to secure the products of these mills in preference to those dyed with logwood. Since manufacturers were uncertain of their ability to get desired colors when needed, operations in yarns were at times limited. Those mills making

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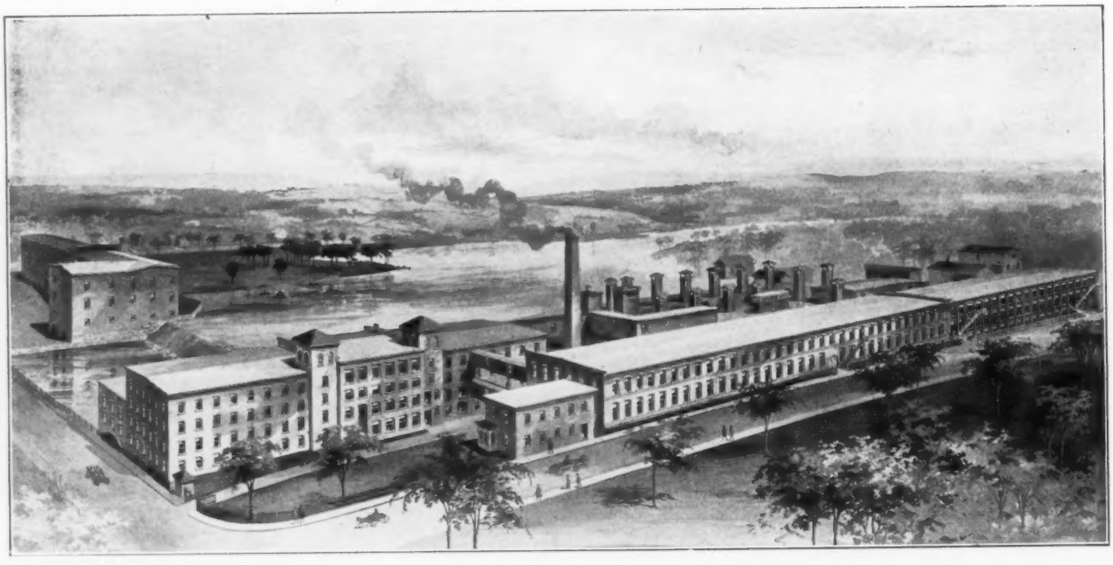

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standard fabrics in piece-dyed goods, were particularly embarrassed, while users of mixtures and vigoreux yarns developed their troubles more slowly. As stocks of colors became more and more depleted, spinners insisted upon buyers specifying the character of mixtures wanted, as prices were determined on the percentage of black required. Constant experiments in logwood and other substitutes were made and manufacturers were loath to hazard the general use of such colors. Black and white checks, one of the year's best sellers in piece goods, required most skillful handling if the colors were to be kept from running in finishing. Eventually several mills were forced to announce they could not guarantee any fast colors in the future, and it is considered at this writing that the early part of the new year will see many others obliged to follow their example. Considerable business has already been placed with spinners for the coming heavy-weight season with prices based on cost of dyeing which everyone felt assuredly could be maintained. The embargo laid by England on logwood, has served to complicate this situation. Many manufacturers profess to be more worried over dyes than over wool costs. On a slub dyed yarn, for example, the cost had jumped from 7 or 8c. to 30 to 35c. a pound for a fast black. This is an item not to be ignored.

A RETURN OF CONFIDENCE

During the last four or five years buyers have practically controlled both the yarn and goods market. They have been able to dictate their own terms and conditions, as manufacturers in their anxiety to operate their plans have been making merchandise at a price, with quality a secondary consideration. This year, however, when buyers delayed their purchases as usual they found the market against them. Raw wool values maintained yarn prices in spite of lack of demand, while continued shipment of army goods to the warring nations, with its consequent heavy drain on domestic wool stocks and goods had its effect in bringing a realization of the short supply. Confidence was slow in developing among manufacturers generally, and it was not until the early fall, when the scarcity of finished goods of all descriptions was revealed by the gradually improved buying power of an employed public, that practically boom conditions made their appearance. Manufacturers had been playing the hand-to-mouth policy as practised by goods buyers, nothing was made up in anticipation, and as buyers came into the market hunting for fabrics, mills soon became well supplied with orders, even at advanced prices. At last distributors of goods had been forced to realize merchandise had a value which no bear tactics could overcome. This condition soon made itself felt in the yarn market in increased interest and buying which developed strength in yarn values throughout the entire trade.

KNITTING YARNS DULL

Knitting yarns have had a dull season. New business was done on a hand-to-mouth basis, and specifications against contracts were limited. Manufacturers apparently did not find a ready market for their goods. Mackinaws, sport coats, and silk goods, seemed to have hurt the worsted and woolen sweater trade, as the latter were neglected by jobbers. Yarn prices, however, were fairly well maintained by wool costs, and early in the year, dyestuffs became another important factor in regulating prices. Popular colors were almost exhausted before many knitters awoke to the necessity of protecting their needs. Not until early fall did a real demand for goods arise. Cool weather then found jobbers and retailers with low stocks and business at once developed along active lines. In view of scarcity of colors, spinners refused to take contracts without a "dyestuff clause," which left the dyed piece subject to existing conditions at time of delivery, and also provided for the contingency of their being unable to secure the dyes. The oil price was the only thing definitely fixed, and many spinners preferred to have their customers take yarns in this form. As retailers rushed these orders for holiday trade, spinners had their hands full making deliveries. They eventually were forced to classify their yarns according to the character of colors used, whether fast or not. Those manufacturers requiring fast colors, such as the bathing suit trade, had to pay the price. No buyer is as critical on shades now as he ordinarily is. Many manufacturers are disposed to anticipate their requirements only under broad conditions to protect themselves in dyes. Here again lack of dyes has acted as a check on business.

OUTLOOK IS OPTIMISTIC

Developments of the year have brought about a constantly growing sentiment in favor of American made goods for America. More attention has also been paid to quality and less to price. This has resulted in an absence of speculation and a good, healthy business. The lesson has also been taught that America produces for the American trade, better yarns and better goods. It has been found in many cases that domestic half blood yarns for domestic use, could not be equalled anywhere. This year has seen a higher price for yarns spun from domestic wools than for yarns made from imported wools. In numerous cases manufacturers absolutely refused to buy yarns spun from foreign wools, paying a premium to have yarns of domestic stocks, because of better results attained. If this same sentiment could be developed among American people for American made fabrics, there is no question but that domestic goods with a value could be sold. The future is more or less a sealed book. Conditions are favorable, but much rests upon the solution of the dyestuff problem. The business is there, according to the views of trade factors, and they will do all in their power to secure it.

Substitute Demand Has Been Active

Stocks Light With Prices High and Tending Steadily Upward

THE unprecedented demand throughout the year for wool substitutes remains unabated, and as a natural result prices are at the highest point ever seen by the majority of those now actively engaged in this division of the industry. The only exception noted was the short-lived boom in 1880, due to an unusual demand for a short period. Never since the days of our Civil War have prices been maintained on a level that even approximates present quotations.

War orders for the European nations have been largely responsible for present conditions, as manufacturers have been forced to use more than normal quantities of substitutes in order to provide the enormous yardages of blankets and heavy uniform cloths required for winter campaigning.

CARDED WOOLENS IN DEMAND

Foreign business, however, is not the only factor that has influenced the course of prices, as larger quantities of substitutes have been employed for domestic consumption than for many years past. The high price of worsteds and the relatively good values offered in carded woolens have created a greater outlet for these fabrics than has been noted for a considerable period. Then, too, the fact that the major portion, if not the entire quantity, of material used for military purposes is utterly destroyed, instead of being available for further manipulation, has been and is an important factor in depleting the stocks of rags and maintaining prices on a high level.

The prevalent scarcity of dyestuffs of all kinds has resulted in an especially keen demand for all shades of rags that may be blended for the purpose of producing the shades required in military cloths, the natural consequence being that khaki rags are particularly scarce and command exceptionally high prices. Mills having foreign contracts have scoured the market for suitable raw materials, and dealers report the highest stocks in the history of the trade. Prices have advanced, in many instances, a cent or two a pound overnight, and in the distinctly boom periods options were not obtainable for more than 48 hours.

LAST QUARTER MOST ACTIVE

The first two months of 1915 saw the market extremely active, followed by a slight lull until the early part of May, when active trading was again a feature of the market, which continued practically, without a let-up, through June and July, with an extra spurt of short duration in early August.

The relatively quiet market of September was followed by greater activity than ever in October, and the market has been increasingly active, with prices showing a distinctly upward tendency through the succeeding months. There is, naturally, more or less discussion as to what may be anticipated at the close of the war, when foreign contracts are at an end and consumption of necessity returns to regular channels.

The absolute dearth of present supplies, and the impossibility of accumulating normal quantities for a long period of time, will effectually preclude the possibility of any great recession in prices for some time to come; in fact, those in position to determine market conditions profess to believe that much higher prices are to be reached in the near future. The rags of the entire world have been gathered up, and, while it is entirely probable that the cessation of hostilities will be immediately followed by a slump in the rag market, it is not within the range of possibility that prices will drop to the level of two years ago for several years to come.

PRICES CHANGE FREQUENTLY

The absolute lack of stability in quotations on rags and substitutes makes it extremely difficult for the manufacturer of woolens to name prices that may be expected to hold for any length of time. As concrete evidence an example may be cited. Fabric samples were made and submitted for approval on a basis of yarn cost of 60c. per pound; when the line was completed, investigation of the yarn markets showed an advance of 15c. per pound, and the further information that in all probability another advance would shortly occur.

A comparison of prices of similar grades, just prior to the outbreak of the war, in November, 1914, and November, 1915, will be of interest as showing the unprecedented rise in prices. The market value of many grades doubled during the latter half of 1914, and an equal increase in price has taken place in the past year, as will be seen by the quotations below for June, 1914, December, 1914, and December, 1915:

	June 1914. Cts.	Dec. 1914. Cts.	Dec. 1915. Cts.
Coarse Light Merinos	5	10½	16
Coarse Dark Merinos	2½	6½	12½
Fine Dark Merinos	4½	7	13½
Tan Cloth	6½	13	20
New Blue Worsteds	15½	13	28
Soft Woolens	4½	7½	13
Dark Skirted Cloth	1¾	4	6½
Black Skirted Cloth	2	4½	7
Green Skirted Cloth	6	9½	11
Black Knit	8½	12	17½
Blue Skirted Serge	5½	9	16
White Flannel	15	19	26
Rough Cloth	2	5	7½
Fine Mixed Clips	8	9½	19
Light Skirted Cloth	2½	6	12
Dark Skirted Worsteds	3½	7½	13½

Foreign Substitute Market Strong

War's Calls for Woolen Goods Helped Dewsbury District

(From Our Regular Correspondent.)

DEWSBURY, ENG., Dec. 20.

CONDITIONS of trade in the heavy woolen district during the year under review have been remarkable indeed. The year opened with plenty of business on hand for during the last quarter of 1914 large orders had been given out by the Allied governments for supplies of khaki, blue gray clothes, and blankets. Every kind of heavy woolen material that could in any way be utilized for cutting up into coverlets had been used up, so that when the year began, mills were busy preparing fresh supplies. After the first few months had passed, there was a slight falling off of repeats for the various kinds of khaki required, but it did not continue for any lengthened period. Clothiers began to be uneasy about their supplies and began to place orders for what they needed. Mills got busy again, overtime and all night work was resumed where it had been left off and it continued for some months. When the year was about half over, the shortage of labor caused by enlistment was felt and mill managers began to look for fresh sources for operatives and not a few workers from the cotton mills of Lancashire were imported into the district and the situation eased somewhat.

UNUSUAL PROSPERITY

Taken all the way through there has never been such a year of prosperity in this particular district. Even in the years 1870 and 1871 during the Franco-Prussian war when the foundations of the fortunes of many local families were laid, there was not the same activity as has been the case during the current year. Mills have worked to their utmost capacity, new plants have been erected and not a few extensions have taken place. The balance sheets of the few limited companies that are published show greatly increased profits and are a good guide generally as to what has taken place in the case of other local firms which no doubt have had an excellent trade. During the last few months more army orders have come to hand, not from our own government, however, as that is reported to have a large quantity of cloth on hand, but from one of the Allies for both cloth and blankets, and in December these have been duplicated in addition to other orders given to a neighboring district for great-coating cloth.

CIVILIAN TRADE BETTER

During the last few months in the absence of repeats from our own government mills have turned their atten-

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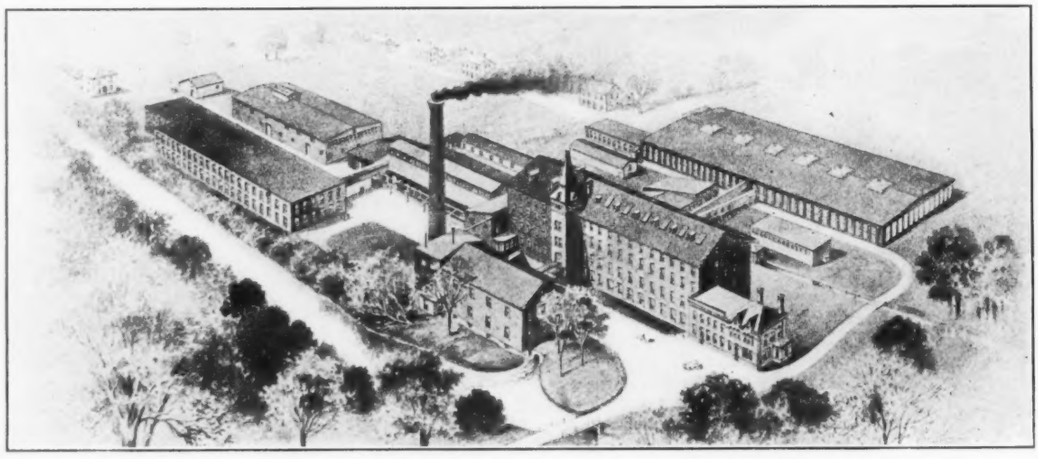

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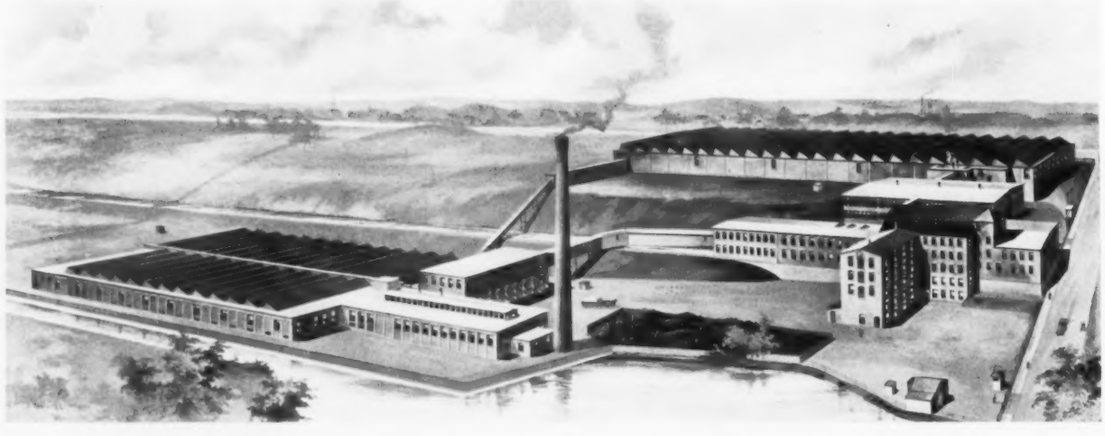

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tion to the civilian trade and a fairly good business has been done, both for domestic and for what overseas demand could be supplied. The latter is limited for the time being, though the colonies have kept up good demand which has been catered to. The home trade has not been far behind, and in spite of the fact that so many men are now wearing khaki those who have been left have had good wages and spent freely on clothes. The variety of cloths produced, however, has not been as in former years. The great scarcity of dyestuffs has been a severe handicap in this direction and the season just closing has been a gray one, black and white predominating. As some neat designs have been put on the market, mills have not been put to much inconvenience and merchants have met the difficulty in a conciliatory spirit. The great difficulty that mills have had to contend with has been that of increasing prices. All possible kinds of mill supplies have advanced in price, wages have been advanced, and the war bonus, which it is agreed shall continue for some little time after peace is declared, has to be paid.

RAW MATERIALS ABNORMAL

The raw material market has had an abnormal year. Demand for both rags and shoddies has been enormous, the consumption unprecedented, and all this despite the fact that export of rags and shoddies has been exceedingly limited.

Last January, after a month or so of set backs, prices began to move upward and it was generally thought that the quantities of domestic supplies would become smaller as the months went by, but contrary to all expectations, supplies increased. Every nook and corner appears to have been cleared out at prices increasing all the time. First of all old cloth and stockings began to advance, then new clips and in March merinos took a turn. Every kind of stock since that time has gone up in price until to-day all records have been broken and the trade generally are asking where is it all going to end. Rags and shoddies of natural shades and colors have been taken to make up for the deficiency of dyestuffs, blacks are abnormally dear and have been gradually advancing during the year, no matter what quality, new or old, fine or coarse, knit, worsted, cloth, or serge. Some qualities are to-day about three times the price of 15 months ago, and demand is still strong. Blues have fluctuated somewhat, and declined a month or so ago, but are now in demand again and the price has returned to the former level. The only line that has not advanced in sympathy with the rest is light gray stock, and because dyes used for light shades are scarce they have also been somewhat neglected, but no doubt they will have their turn.

BOOM CONDITIONS

The trade generally throughout the whole year has been a great puzzle to all engaged in it, and prices have been advancing all the time. There has been no little speculation and those who have taken the heaviest risk have done the best and not a few handsome fortunes have been made. As one has aptly put it, how much it will be is an unknown quantity until some months after peace is declared, for it is the opinion of many that then prices will drop. It is certain that in many low-grade materials and especially those used for making army and navy supplies, will not be wanted in large quantities after the war, and when they begin to accumulate values will decline. Prices in numerous lines are undoubtedly artificial at the present time and have plenty of room to drop. There will undoubtedly be a reaction from to-day's prices, but when, no one knows.

IMPORT AND EXPORT OF SHODDIES

As before stated export trade has been limited and only possible under license. Our allies have taken a fair amount of stock, Italy and France having of recent months bought freely, but Russia, owing to difficulties of transport has only taken a limited quantity. Shoddies have been shipped to northern Europe but in limited quantities and then only such lines as were not wanted for the home trade, or were unsuitable for army needs. The import trade has been fairly brisk and large quantities have come forward, though by no means up to those of the previous years. In spite of heavy freights, regular quantities have been imported from America, but it is understood that shipments are to-day small. France has shipped enormous consignments, but from northern Europe only limited quantities have come and those at irregular intervals. Holland has sent in fair quantities which have recently obtained record prices, Canada has not been far behind her usual quantities and has all the year shipped regularly what has not been required at home. In a crisis the raw material trade is generally the first to feel any change either for or against. It is clear that for some time, at least, this district will have to depend on the home trade to keep things going, and under existing conditions the prospects cannot be called brilliant. The call for economy will have to be faced and the labor question is an important factor. When the time comes when we can import from the Continent a change will come about. Many dealers are marking time and buying only from hand to mouth. Some stores have little stock on hand, especially the smaller firms, and those who have large quantities are content to wait a while, only realizing when they can get their price. There are a few who are still buying even at to-day's level of prices, confident that the limits have not yet been reached. Generally speaking, the trade expects prices to be maintained at present level for some months yet, but some buyers are making up their minds to try to be almost clear of stock when the slump does come round. It is in a great measure a lottery on the continuance of the war.

MUNGO.

TEXTILE COST FINDING

(*Continued from page 52*)

weight of the warp is to divide the number of inches in it by the yards per pound, or per ounce of the yarn used. In our example the result of this division gives eight ounces as the yarn weight. Everyone who is at all conversant with textile manufacturing is aware of the fact that the crossing of the warp threads under and over the filling necessarily bends them out of a straight line, so that in a given length of cloth there is a greater length of yarn than the cloth measurement would indicate. The estimated take-up in this instance is 8 per cent., and in order to obtain the true weight it is necessary to add the amount of the take-up.

This is done in far more instances than one would suppose to be the case, by finding eight per cent. of the weight previously obtained and adding it to this amount, the sum thus obtained being, supposedly the weight with take-up added. Such, however, is not the case. In our example the result obtained in this manner would be 8.64 oz. The only correct method of figuring the weight with take-up is to consider this as 100 per cent. Then deducting the percentage of take-up, in this case eight, we have .92 as the percentage represented by the weight obtained in the first calculation. Next, to obtain the weigh with take-up, it is necessary to divide the weight first obtained by .92, giving as a result 8.696.

NO EXCUSE FOR INACCURACY

Possibly it will be thought that the percentage of error is so slight as to be negligible, and it is true that in this particular instance such is the case, but that fact in no wise incurrs the use of inaccurate methods, as, if they are employed in this instance they will be in there when the percentage of error would make a material difference as will be shown hereafter. While it is true that the major portion of the ordinary type of woolen goods manufactured would show a percentage of error no greater than that in the above example, there are occasional fabrics in which the difference made by correct and incorrect methods of figuring would be a very material item. Suppose that as an example of this class of fabrics a cloaking is selected on the bouclé order, one that owes its characteristic appearance to the use of a luster thread dressed as an extra warp, the loops being formed in any of the various ways with which weavers are familiar. In many of these cloths the take-up of the pile warp is 50 per cent., and in some instances even more.

A CONCRETE EXAMPLE

Assuming that the weight of the extra warp as figured from the length as it appears in the finished cloth is, as in the previous example, eight ounces. In this instance the incorrect method of figuring weight with take-up added gives as the weight of yarn actually present 12 ounces, the correct method of figuring shows that instead of 12 ounces of yarn 16 ounces are required, a difference of four ounces. No one will deny that an error of this amount is a very serious discrepancy, which, at the price of even a low-priced luster yarn would amount to from 16 to 20c. or far more than the estimated profit on any but the most expensive cloths.

OTHER INACCURATE METHODS

This is probably the most obvious and prevalent error in making up cost estimates and is therefore first brought to the attention. Some of the others are less obvious and though, as a general proposition, they occur with more frequency, if possible, they are more difficult to elucidate. It is often a very hard matter to induce a manufacturer to change methods to which he has become accustomed during a long period of years. Take the matter of stock mixtures, for instance. In the majority of cases no consideration whatever is given to the amount of oil or other extraneous matter the stock may contain and in laying down a batch at the picker the proportions are figured as though all the stocks were clean. As a result, the mixtures contain a far greater actual proportion of wool than has been estimated, and the shrinkage during conversion processes, waste and invisible loss, is far in excess of the estimate.

In nearly all mills it is customary to use the clean card waste, roving and other soft waste in succeeding lots of the same mixture, and in addition to this to add the dusted card waste, with no thought of the oil that it contains. If this subject is given due consideration every one will agree that the card waste carries a far greater percentage of oil than does the roving as well as a large quantity of dirt that is not removed by the operation of dusting, all of which, when placed in the next batch tends to depreciate its working qualities and take away from the strength, elasticity and quality of the yarn spun therefrom. Much better results would be obtained and more uniform fabrics made if the heavy card waste was first scoured, for by such a procedure the oil and most of the dirt would be eliminated, leaving only such material as is available for yarn making. The contention that the expense involved would militate against the advantages of this method is not at all well taken, nor can it be successfully maintained. It should be obvious to any one that the admixture of a quantity of dirt and grease to a lot simply tends to depreciate the carding and spinning properties of the batch without giving it even the benefit of the available fibers in the waste.

VARIATION IN RAW MATERIALS

The wide variation in the working qualities of the different types of work and substitutes that may be used in the blends is a very important factor in the cost of raw materials, which consequently affects the cost of the finished product. In order to obtain the best results the manufacturer must have an intimate knowledge of the carrying and spinning capacities of the different classes of work, employing in each mixture that best adapted to the particular fabric which it is desired to make. With far too great frequency the cost of the blend as laid down at the picker is taken as the basis of the yarn cost, little if any consideration being given to the yield of spun yarn. If accurate records are kept of the amount of stock used in each lot with its cost and the weight of the yarn spun from each lot, it will many times prove the truth of the assertion, that a more expensive mixture would result in a less expensive yarn, better work in the carding, spinning, and weaving, with a greater yardage of finished goods and an enhanced profit.

PRODUCTIVE CAPACITY ELEMENT

On certain types of low-grade goods this is especially true as the cost of conversion is often fully equal to, or even in excess of the cost of raw materials. In connection with this proposition, it must be borne in mind that in the present day the season's profits are vastly more dependent on continuous operation and a capacity output than on large unit profits. It might appear at first glance that a larger profit on a smaller yardage would prove more desirable, but this is seldom found to be the case, for reasons that are very readily discernible. Overhead expense, that most elusive of all factors in cost finding, does not vary with the production directly, but inversely, though not in the same ratio. Thus, if we have a fifty-loom mill turning out a product of 10,000 yards weekly, with overhead charges of $500, the cost per yard is but $.05; if because of lack of sufficient distribution, work that runs badly, or any other cause, the weekly production drops to 8,000 yards weekly, the cost per yard, automatically, advances to $.625, a difference of 1¼ cents, or probably 25 per cent. of the anticipated profit.

It is probably true that these figures are slightly in excess of results that would be obtained in actual mill practice, but they are not greatly so, and will serve to illustrate the point we wish to emphasize. Should the lessened production prove to be due to badly running work, a change in the stock mixture, not necessarily to a more expensive blend, will frequently be found to obviate the difficulty and bring production up to the standard.

COMPARATIVE COSTS AT A GLANCE

Cost systems can be devised, and, in fact, are now in use in many of our up-to-date mills that are capable of showing almost at a glance, not only comparative costs at different periods for similar work, but the progress of various lots through each department. The latter feature is particularly desirable as it permits the superintendent

A. N. Litch, President W. H. Chase, Treasurer

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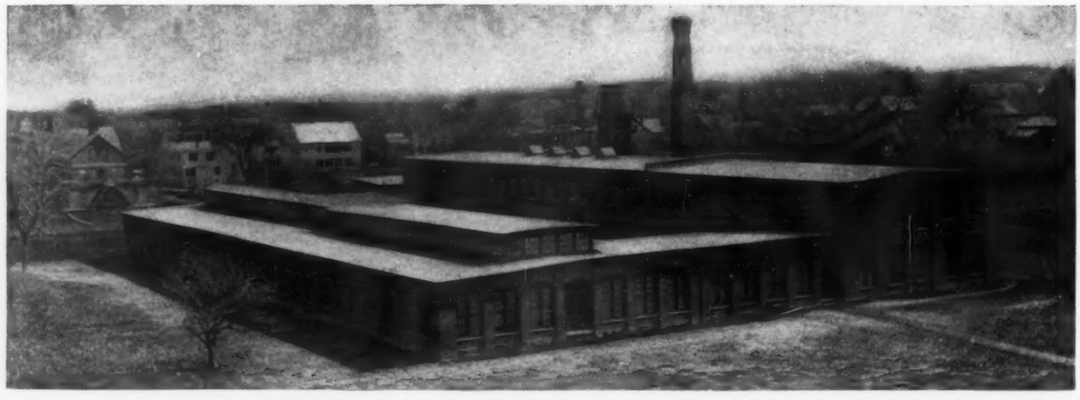
Leominster, Mass.



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to take up the matter of delivery of various styles intelligently without going to different departments to secure the necessary information. There is no little diversity of opinion as to the best method of handling the matter of overhead expense, particularly in seasons when from one cause or another the plant is operated on a short time schedule. There are those who very strongly advocate the carrying directly to the profit and loss account the excess overhead due to such causes.

Such a method of procedure is attended with grave dangers, however, and would afford opportunities for covering up errors of judgment and laxity of attention to detail that should not be permitted to pass unnoticed. Cost of production, in the last analysis, when reduced to a yardage basis is the sum of all the expenses connected with the manufacturing of the goods during a certain period divided by the total yardage produced during the period under review. There are, of course, certain unfortunate features connected with the manufacture of woolens that crop up from time to time that are seemingly unavoidable, such as poor work, short time, etc., but these are factors that must be reckoned with and it must be recognized that they have an intimate relation to conversion costs. It should be the aim and ambition of every mill manager to obtain the maximum of production at all times and by this means keep his production costs at the lowest possible point. One of the most serious objections to the disposal of excess overhead referred to is the danger of self-deception as to actual costs, a fact that is brought home very strongly at the semi-annual inventory period when profits are found to be nil, or far below what the estimates would indicate. In theory the method mentioned is very plausible, but in actual practice it is highly probably it would be found to have many bad features.

ELEMENT OF LABOR

Labor costs are much more easily taken care of, and wherever piece work is in force, will be found to have but little influence on the total expense of conversion. There is, however, in every department of the mill a certain amount of unproductive labor that must be considered as a direct charge on production, and it is in this item that it is possible to make savings that are not at all times taken advantage of to the fullest possible extent. It may be overdone in a few instances, but these are extremely rare in comparison with cases where labor expense is allowed to remain at practically a fixed standard during dull periods. Contrary to a very prevalent idea, however, a low wage list does not usually indicate a relatively decreased cost of production, but very frequently is a symptom of an opposite condition of affairs. The weekly average wage in mills, operating on similar classes of goods, must not be considered alone but in connection with the production sheets before it is possible to form an opinion as to which is being operated at the lower cost or is handled more efficiently.

It is so well known as to have become practically an axiom that high weekly earnings in the weave room, other things being equal, mean that the production is obtained at a minimum of expense, and in nine cases out of ten the converse will prove equally true. The better running work will also attract the more skillful operator, which tends in the direction of greater efficiency, less waste and increased production at less expense. A high earning power is invariably very closely associated with ability of more than ordinary degree and well woven cloth is a dominant factor in the reduction of finish-room expense.

AUTOMATIC MACHINERY INSTALLATION

Another factor of no little importance in reducing conversion costs is the installation of automatic devices of various types throughout the plant. Machine labor is less expensive than manual, and the cost of installation, though it may appear a greater expense than is authorized under the conditions prevalent at the moment, will be well repaid by the increased output and improved quality of the product. Frequently it will occur that the operatives are not in favor of innovations in the way of improved machinery and unfamiliar accessories through fear that greater output will be required with no increase in earnings. This fear is groundless, however, as will be amply proven by a close scrutiny of the history of the industry. It may be true that the earning power of day workers has not been materially increased by the increased use of new and improved machinery, but the piece worker has seen his earning capacity very much increased and the effort expended lessened to a corresponding degree.

The introduction of the warp-stop motion, now so universally used in our cotton mills and rapidly coming into use in our woolen and worsted mills, might be cited as a concrete example of the devices that have had a marked effect on textile costs and production. The writer had charge of a mill of 150 looms on men's wear worsteds where forty looms were equipped with warp-stop motion. A careful record was kept of the results obtained both as regarded production, quality and expense. The output of the looms showed an increase of five per cent. for six months and during the same period the cost of sewing was reduced 33 1-3 per cent. Should this record be maintained for two years the savings made would entirely reimburse the mill for the installation expense and all further savings would go to increase the profits.

We have pointed out a few of the weak points in textile cost finding and hope to be able to outline a system of records which with slight changes to suit the requirements of individual cases will be of material assistance to the manufacturer in keeping his records of stock, production and costs in such manner that it will be but the work of a few moments to obtain any desired information as to costs in any department, progress of the work or stocks on hand or in process. All this without entailing the accumulation of a mass of useless data that will prove laborious to care for. The subject is one that has been lightly touched on at various times and many systems have been exploited as cure-alls for the difficulties encountered in this broad field. Unfortunately many of these have been so intricate as to make the remedy worse than the disease and have been discarded after a short term of service.

(To be Continued.)

TARIFF COMMISSION

(Continued from page 45)

process of readjustment. But this was not because a change was being made—it was because the whole country knew that the protective tariff rates would be radically reduced to a basis of tariff for revenue only by the political party in control of Congress, to whose Southern leaders protection was a thing abhorrent. No fear of adversity accompanied the framing of the Dingley tariff of 1897. On the contrary, business instantly and wonderfully improved in that year and in the next the country went into the unescapable war with Spain fully strong, prosperous and confident.

The violent contrast which the United States afforded in the European war, summer of 1914, was not due to any blunders of detail in the Simmons-Underwood tariff of the year preceding. Defects there were in that tariff, indisputably, as in the sectional selfishness that kept Southern rice and mohair dutiable and put Northern wool and grains upon the free list. But the tariff of 1913 as a whole was reasonably well constructed from the standpoint of the men who really made it. It satisfactorily achieved their purpose of striking out as far as possible all protection to Northern agriculture and manufacturing and of placing the tariff on a basis of revenue only after the example of 1846 and 1857. All the disaster and suffering which that ill-starred law of 1913 instantly brought upon the country were the direct, inevitable consequences not of any miscalculations in the law itself but of the fundamental principles and policies which the law embodied.

No permanent tariff commission could have averted that catastrophe. If such a commission had been in existence its facts and figures would have been as utterly disregarded as were the reports of the Tariff Board in 1912. It is free trade tariff-making, not tariff-making per se, that periodically menaces the life of industrial America, and the true way to put an end to this plague of our times is to put an end to the foreign and domestic interests that are responsible for free trade agitation.

When this has been done, and not before then, it will be time again to consider whether a special commission or board of studious, practical men can assist Congress in the gathering of information upon which a just and adequate protective tariff may be maintained—a tariff so carefully framed that the risk of partisan attack upon details may be reduced to the lowest possible minimum. It is conceivable that in such an event trained and competent men, giving undivided attention to their work, might be of real assistance to the committees of Congress charged with supreme responsibility for all revenue legislation—a responsibility that will never be relinquished. But first of all, above all, let honest believers in a tariff for both revenue and protection stand firmly together, undistracted by secondary issues, until a great and decisive victory is won.

TEXTILE ALLIANCE

(Continued from page 134)

and not used for domestic consumption. The guarantee by the importer must be accompanied by a remittance of 1 per cent. of the foreign cost of the merchandise as shown by the consular invoice. This foreign cost shall be considered the total cost at the port of departure, including all charges, but not including prepaid freight and prepaid insurance. It was agreed upon the establishment of the plan that any balance after the services and expenses of the Alliance were deducted should be returned pro rata. In accordance with this agreement the Alliance announced at the end of October that a return dividend amounting to 50 per cent. of the commissions would be paid to those importing under the plan as of Oct. 1. Further pro rata returns will be made dependent upon the expenses of the organization. With the consent of the British authorities many commodities have been released from the letter of this requirement and an oral or implied promise by the purchaser is regarded as sufficient.

As noted above, the modification of the original plan was made to allow the export of tops and yarns to Great Britain and Canada. For this a charge of ½ of 1 per cent. was made. At the beginning the arrangements did not contemplate such exportation as it was felt that if the United States were sufficiently well supplied with material to permit of its exportation, further supplies from the British Empire would appear unnecessary and the issuance of licenses would be discontinued. As far as known, however, the business in exports has not been of large proportions. Further modification of export regulations gave permission to ship tops and yarns to Russia, France, Italy and Japan, provided they are consigned to the respective governments and that the shipments went forward by way of the United Kingdom or any of its dominions. This permission to export was made July 1 for three months, but late advices indicate that the arrangement will continue subject to revision at any time. Late in September cable advices indicated that the Colonial Office was willing to allow the shipment of crossbred wool to allied countries and America up to normal quantities. This arrangement, however, is likely to be superseded by an announcement that American licenses on crossbreds have been suspended, as a stock taking is in process as the year closes to ascertain if normal quantities have been reached.

MEDICATED WOOL IN WAR TIME

Some discussion has taken place recently in Lancashire on the point as to whether textiles for hospital use come under the description of munitions of war. A short time ago, as recorded in our columns, the submission was made to the Rochdale Munitions Tribunal that the making of machinery for carding wool was munition work, because the wool was used in medicated dressings. Mr. Sellers, the chairman of the Tribunal, declined to accept this view, but undertook to get the opinion of the solicitor to the treasury. In forwarding the question, however, he inadvertently spoke of the making of cotton wool, and not of the machinery to be used in the preparation of the wool. The reply received is to the effect that nothing required for use in war can be excluded from the definition of munitions, "but it is difficult to conceive a case in which the manufacture of cotton wool for dressings could be covered by the munitions order under Section 7." That confirms the original stand of Mr. Sellers. But while Mr. Sellers made this announcement at Rochdale on Thursday of last week, he also mentioned at a sitting of the Oldham Tribunal (also last week), that his decision had been arrived at on the ground that, in the first place, the Munitions Act was passed to get things manufactured to kill people.

Really the whole thing is somewhat paradoxical, for while medicated wool is not directly used in destroying life, but in assisting to preserve life, its use helps to bring men who have been incapacitated in the war back to that state of physical fitness which will enable them "to kill." The repair of human "machinery" in war time is surely as important as the turning out of guns or shells in the engineering shops. On that ground, therefore, the manufacture of medicated wool might be reasonably classed as munition making, and so also might the preparation of necessary machinery, if it could be shown that such was to be used exclusively on the manufacture of medicated wool for our military hospitals.—*The Textile Mercury.*

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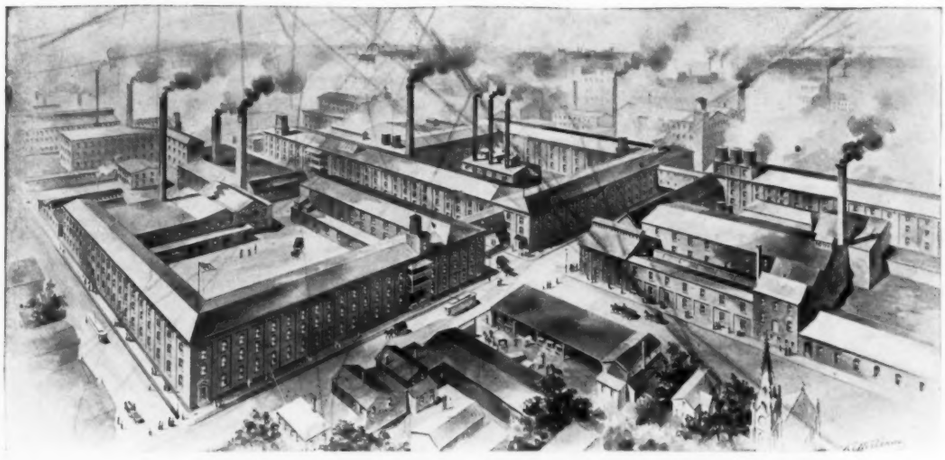

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Technical Section

Woolen Carding

By a Woolen Superintendent

THERE is probably very little danger that any one conversant with the manufacture of woolen goods will gainsay the statement that the yarn making processes, particularly carding, are the foundation for successful cloth making. In fact, there are many competent manufacturers that will go so far as to say that the card room is the heart of the woolen mill, and that on the results here obtained depend the possibility of turning out a first-class fabric.

There is no little basis in actual mill practice for this statement, as every one familiar with the routine of mill work has had forcibly impressed on his mind the fact that without good yarn it is an utter impossibility either to secure a high ratio of production or a satisfactory finished fabric. Without good carding the production of first-class yarns is an impossibility, hence the great stress placed on the work of this department.

CLEANLINESS A FACTOR

Should we, however, base our opinion as to the relative importance of the different processes from observation in some of our mills, it is more than likely that the card room would take a very low rank, as it is apparently very much neglected, the machinery allowed to fall into bad condition, the room far from clean, and waste allowed to accumulate on, about and under the machinery. This state of affairs should not be tolerated, not alone for the reason that no machine is capable of performing its proper functions while covered with waste, but for the further reason that it tends to promote careless habits, as well as ideas that waste is an item of negligible importance and the material in process of comparatively little value.

GOOD MIXING IS IMPORTANT

In order to obtain good results in the carding department it is of the utmost importance that the preparatory processes be properly and carefully performed, as unless the stock is well mixed and picked with an adequate amount of good lubricant, the cards cannot properly perform their function. In the mill of average size the picking is usually under the supervision of the card room overseer, which is an excellent arrangement, as he, more than any one else, is directly interested in having it performed in a proper manner. Thorough mixing of stock and colors is important, as laxity in either of these matters will inevitably show in later processes or in the finished fabric.

To insure a thorough blending of the stock, the batch should usually be laid down in front of the picker in layers of about six inches. In case a very small percentage of a color or stock is to be used, it would be advisable to mix this with an equal quantity of the chief component of the mix, run this through the picker and use as one of the layers. This will insure a thorough mixture, and will assist in preventing what is far too prevalent a defect in mixing goods, a blotchy appearance in the finished fabric. The last sentence refers to color effect only; the defects caused by unequal blending of stocks differing in spinning value are very likely to make themselves known in the carding and spinning or to show up in the loom in the form of tender yarn.

IMPERFECT MIXING

In the card room imperfect mixing will be likely to cause uneven roving or possibly will show in the form of "twists," while in the spinning room the latter defect will be prevalent and production will be reduced because of a noticeable lack of strength in portions of the roving, causing a vastly increased number of "ends down" at each draw. It must not be inferred from the foregoing statement that every case of poor work in the spinning room is due to poor work in the picker room or to defective carding, but other things being equal, it is usually safe to assume that the difficulty may be traced to one or the other of these processes.

WATCH CARD ROOM EQUIPMENT

It must be evident to anyone that it is impossible for the most expert workman to turn out a superior product with inferior tools, but in spite of this fact there is a disposition evidenced by many mill managers to neglect the requirements of the card room and force the carder to attempt the production of approximately perfect roving on machinery that is sadly deficient in clothing. Under such conditions it is manifestly impossible for the most expert workman to achieve the highest type of results and in many instances the responsibility for inferior work is placed on the carder when by right it should be placed on the manager's refusal to purchase the necessary clothing to put the cards in first-class condition. This is particularly true when low-grade stock is being worked, many mill managers holding to the idea that any sort of machinery is good enough for making coarse yarns. While it is true that a slight unevenness will not be as apparent in two-run yarn as the equivalent variation would be in a thread spun to five or six-run, the fact remains that the thread is uneven and on certain styles the difference in size of portions of the thread will be sufficient to show in the finished goods.

On cards with clothing in poor condition or badly shelled out, it is impossible to thoroughly comb out and mix the stock, and as a natural result a part of the thread will have an excess of short fibers, thus detracting from its strength and making poor weaving. The aphorism that a chain is as strong as its weakest link is applicable to the woolen business, many weavers being able to testify that a warp is no better than the poorest yarn it contains.

PRODUCTION COSTS

Production costs in the department may be brought to a very low figure under proper conditions by intelligent management, but unfortunately skill in mechanical operation of machinery is not at all times combined with executive ability and it will often be found that a carder capable of obtaining excellent physical results does so at a high cost while another man with possibly less technical skill will be able to obtain approximately equally good work at a greatly diminished expense, owing to superior ability in management of the room.

The production of a set of cards is a variable quantity, depending on so many factors that it is a difficult matter to state just what should be expected without an intimate knowledge of the details of equipment, condition and dimensions of the machines, speeds and variety of stock in process. There are cards in operation in some of our best mills only 30 inches in width with main cylinders not greater in diameter than the doffer on the most modern type of machines, that are turning off excellent work, though naturally the production is small. The card of the type most used is probably the 48 by 48, that is, with the main cylinder 48 inches in diameter and the same in width. Such a set, three machines, should be capable of turning off roving sufficient to supply five broad looms with warp and filling, for all ordinary cloths. The amount of daily or weekly production is naturally governed to an appreciable extent by the character of the raw material and the size of the roving made therefrom, as it is not practical to increase the speed of the ring doffers on fine yarns to a sufficient degree to offset the decrease in weight of the sliver. The yardage of yarns producible, however, may be considerably greater on fine yarns if it is not attempted to card the roving finer than the stock will warrant.

CO-OPERATION BETWEEN CARDER AND SPINNER

There must be the closest co-operation between carder and spinner if the best results are to be obtained. It will frequently happen that the production of the cards may be increased to a considerable extent by making the roving heavier, increasing the draft in the spinning to draw the thread to the desired size. Not only an increase in production that may be obtained in this manner, but within reasonable limits, an improved product, as the drafting has a tendency to increase the parallelization of the fibers and bring the strain of weaving in the direction of their greatest strength. Good judgment must be

(*Continued on page* 170)

The Origin of Worsted

By J. A. Hunter

THE fact is generally known to worsted manufacturers that the name of this product is derived from the name of a place, Worstead, near Norwich, England. No large body of information is obtainable about that place, but an effort may be made to bring together a collection of gleanings from many sources. The name of it has been given different renderings in different terms. It was "worsteds" in the document in which Edward the Confessor gave the lordship to the Abbot of St. Benet of Holm. "Wrthsteds" is another variant, and at the time that an inventory of all the lands in England was made by the Norman conquerers the name was given as "Urdestads" and "Wrdestada." One Robert, an officer and a cross-bowman, held the land for the abbot at the Domesday Survey and his son Odo assumed the name of "Wursted." Like a great many of the place names of East Anglia, this one is suggestive of Danish occupation. "Warth" is Anglo-Saxon for a field, farm or manor, and signifies sometimes a road or public way; "stead" is a place. A free transcription of the name might be "agricultural settlement."

The place being identified, the next step is to connect it with the goods. The connection is established firmly enough by entries upon the Norwich Roll of 1307 mentioning Cloth of Wrthsted and Aylesham, the latter being another Norfolk village. In 1314 there were complaints of the measure of cloth called Worthstedes, and in 1329 weaving was evidently carried on there. Robert de Poley, the alnager, whose business it was to keep the East Anglians up to the mark in the matters of length, width and weight, had to complain that seven weavers of Worstead with ten others of Sloley, Dilham and other places were conspiring to prevent him from the due execution of his office. One of the Worstead weavers, named William Alblaster, has been presumed to be a descendant of the Robert Balistaries, who was a landholder at Domesday. His people remained weavers for many years afterward and were apparently persons of consequence. Whether as a result of this encounter or for some other reason, it appears that Poley lost his position for his patent was revoked in the same year.

Weavers from Worstead would seem to have taken their craft elsewhere, and in 1352 one Nicholas de Worstede appeared as a member of the gild of London weavers in a suit to prevent Giles Spolmakere and other aliens from carrying on weaving in London without paying dues to the gild. It was of course a shorter step to the city of Norwich than to the city of London and worsted weavers became plentiful at the first-named place. For some reason which has not been fully elucidated certain Norwich workers who had been described as worsted weavers in earlier documents became known as "Irelonders" and in 1315 a number were making cloths called Irelonds. The change might mean no more than that they made worsteds out of Irish wool, or they may have begun to imitate Irish fabrics, for there is evidence there was a manufacturer of light worsteds in Ireland at this time and that the Irish products were appreciated and imitated in Spain.

At all events the Norwich people came to be known as the worsted weavers again. In a register of 1377-1399 one Gregorius Clerk, mercer, was set down as the son of Johannis Clerk, worsted man, who may have been a dealer in tops or yarn. In 1446 Elizabeth Baret, single woman, was described as a worsted weaver, although in almost all other years the weavers were men. John Fygge is the name of one of them (1463), and Robert Acres (1511) of another. Altogether 297 worsted weavers were admitted to the Norwich corporation in 1485-1547.

These particulars, although they establish the connection between the goods and the place, are far from explaining how the industry started in Worsted and why the commodity came to be named after that village. Worsted was never anything but a small place like enough to the other places round about. The historians have made shots at an explanation without producing such corroborative detail as compels belief. One of the best of them says that several Flemish workers settled at Worsted and it is as likely that they did settle there as at several other places which have not gained immortality by conferring their names upon the industry. A Norfolk

writer of less authority says that "at or near Worsted the spinning of fine woolen yarn was first brought to perfection." The case may be so, but the proof is absent. An Act of 1542, which claims worsted goods as the private commodity of Norwich and defines them as goods made only from Norfolk wools, does not amount to serious proof that no other form of stock was employed. However, in view of the state of communication six or seven centuries back and in view of the known excellence of Norfolk as a wool-growing territory, it is altogether reasonable to suppose that local wools took the first place. Precise details of the character of local wools at different stages of history have not been preserved, but there are grounds for believing that the raw material employed was wool from Old Norfolk breed of sheep, a fine and silky wool from animals ranging over heath land. This wool must have been just as accessible to Worstead as to other neighboring places.

HOW WORSTED WAS SPUN

Assuming that the especial fame of Worstead was made by the local yarn, it is pertinent to inquire how the yarn called worsted was made. It was spun, as many accounts show, upon the rock or distaff, the simplest and oldest of all spinning implements. Therefore it is not intrinsically likely that the Worstead settlers of the eleventh or twelfth centuries were the introducrs of the means by which the spinning was done. Possibly enough they brought a superior skill and worked up a reputation for their product, but upon this point there are only vague assertions unconfirmed by details. Some "Notes on the Diversities of Wools, Yarns, etc.," by Thomas Caesar have been preserved from 1596 and, although this is long after the beginnings made in Worstead, the testimony is useful. Caesar divided the methods of spinning into three: first, using the great wheel for making woolen yarn; second, the small wheel for making Gurnsey and Jersey yarn (for knitting), and third, the rock "for worsted yarn, so-called because that manner of spinning was first practised at Worstead in Norfolk."

There is another possibility which should not be disregarded. Names are capable both of major and minor signification. All wool is worsted in the modern sense that is combed or is spun with parallel fibers, but not all worsted is regularly called worsted, in modern England, at any rate. In ancient Norfolk it is at least conceivable that in several villages wool of the same sort was turned into yarn in the same way. On conversion into cloth the yarn might be used upon one structure or another and if the Worsted weavers adopted one alternation of threads that way would be their way and came to receive their name. If the Aylsham and Cansto and Sloley and Dilham weavers preserved their own individual design then those cloths would become identified with their names. There is something to show that at a comparatively early date a worsted cloth was not simply a combed yarn cloth or a Worsted-made fabric, but a structure woven in a particular manner. Some perception of this view of the case was present evidently in the mind of Thomas Caesar. In one of his "Allegations" he says:

"Worsteds in ancient times were understood to be the several cloths made by the tradesmen of that mystery, of the yarns then spun and either received the name . . . from the place where first made . . . or else are called worsteds by a figure, when the whole is taken for the part, or as the genus for the species."

Whether the whole was taken for the part or the part for the whole need not trouble us. The worsted weavers of Norwich did make goods other than those called worsted and before Caesar's day had formed themselves into a "Corporation of Wolsted-Russel makers," the latter apparently being the Russel cord that is still made for upholstery. Simply by varying the treadling of the loom they could make instead of worsted, buslian or double or single camlet. Cæsar is explicit on the point:

"A worsted was wrought with four treadles; to make three of a bustian is to weave with three; to make a double chamblett is to use two right foot treadles, to make it single the two left foot."

WORSTED A WEAVE

The testimony establishes the point that a worsted was at least in one of its connotations a weave, but apparently the weave was called a worsted only when executed upon a particular material, namely, combed yarn. Worsteds were not the earliest production of the Norwich textile industry. According to replies made to assertions of the citizens of London in 1578:

"First were made at Norwich . . . cloth called Norwich whightes then wursteds, then monkes clothes, after them russelles, after them sayes, bustyns, chamlettes and sutch other lyke commodities."

If the Norwich whites were like the cloths called whites and made in many other parts of the country, either for export or for dyeing in the recognized centers of the English dyeing trade, they would be coarse carded-woolen goods and presumably of heavier weight than the worsteds made from combed wool.

The woolen weavers or "wollenwevers" and the worsted weavers existed side by side and had their seporate gilds which did not always coexist in amity. The "Wollencloth Norwich Cloth" employed "weavers, ffulleres, spynneres and carders" who, according to a quaint resolution of 1460 were to have "redy money for ther workmanshipp." The woolen and the worsted trades had their separate shearmen, jealous of each other's spheres of operation.

The worsted weavers had to complain of the yarn dealers of 1511 and particularly of "regraters, called hukkysters" who bought worsted yarn "havyng no cunnynge to deserne which is gode and which is defectyve." The purchases would be made naturally from the families of the rural districts whose children used to do the spinning. Children spinning worsted yarn formed one of the exhibits in the Norwich pageant of 1579, made for the visit of Queen Elizabeth, and people weaving worsted cloth formed another.

Sundry causes contributed to make the Dutch and Walloon Strangers in Norwich represent in 1504 the "comoditee of woorsted makynge" as greatly decayed. The cloths were "owte of estimation and vente" and the "makers and woorkers fayne to geve themselves to other exercises and trades." This is a perceptibly less cheerful tune than that of 1523 when the parliament of Henry VIII "discretely considered the true making and draping of Worstedes, Sayes and Stamyns" to be "oon of the moost profitable occupacions of this Realm." Indeed that parliament gave worsted cloth a testimonial that worsted manufacturers should be the last men to ignore. Almost they might inscribe on their banner the conclusion that worsteds "truly and substancially made and wrought ben right acceptable and comodious merchaundises as well in England as in other faren regions and countries."

Review of the Paper Textile Industry

By Denina

IN recent years the manufacture of paper textiles has made a notable advance. The idea is not new. From time immemorial the Chinese and Japanese have employed paper in forming rope with which to tie bales and packages and as fine yarn, used for weaving purposes. Even to-day in Hongkong it is not unusual for a Chinese merchant to twist a strip of paper to tie a bundle for his Celestial customer.

In the United States after the Civil War, during the memorable cotton famine period, more or less successful attempts were made to produce paper twines, but this industry was gradually eliminated with the return of a normal supply of cotton, and with the exception of one mill, all these early attempts were abandoned. There is one successful mill in the South to-day which dates its beginning from this period.

Experiments with paper textiles have never ceased, especially in England, Sweden and Germany. In 1892 two German engineers, Keller and Turk, produced the first truly commercial paper twisting machine, which was soon followed by another type by Claviez in 1897, and shortly after two other Germans, Muller and Kron, brought out still another twister. With these machines it was possible to develop the field on a commercial basis and insure its permanency.

MACHINERY NO LONGER A NOVELTY

The paper twister to-day is no longer a novelty. There are at least a dozen different machines on the market, and two of them are of American make. The industry has grown steadily and in several countries has gained quite a notable success in various articles. Japan employs paper to a considerable extent as a filling in silk ribbons. England excels in heavy ropes and twines with other fibres as the core. Germany has developed the bag and wrapping industry and at present, when jute is unobtainable, the paper yarn manufacturer is "the man of the hour," producing not only a substantial, but a cheap substitute.

In the United States an excellent line of floor coverings is being manufactured. There are a number of successful mills whose yearly output in all paper and wool floor coverings runs into the millions, and recently earnest attempts have been made to use this material for baggings and other articles where until now only jute has been used.

MANUFACTURING PROCESSES

The manufacturing process of paper yarns is similar on all types of machines, the raw material, paper, is cut into narrow strips varying from one-eighth of an inch to four or even five inches in width. In European countries, only the very best Swedish kraft is used, which has a strength that rivals other textile materials. Such stock is used in two of the American paper yarn mills. One Southern mill uses an American made sulphite sheet for the heavier yarns, and light-weight tissue paper for the finer numbers. Two large carpet mills in Massachusetts and Pennsylvania use tissue paper almost entirely, while another mill in the Middle West has succeeded in making a satisfactory yarn from a very cheap paper stock, the twisting of which up to this time has been considered an impossibility.

Paper twisting may be divided into two operations. First, the preparation of the stock; second, the actual twisting. The first process consists in slitting the big paper rolls, which weigh from three to seven hundred pounds, into narrow strips of various widths and rewinding them into solid discs, ready for the paper twister. This process, while on the surface a simple one, corresponds with the carding preparation of other textile materials. It requires the utmost care and attention because the amount of waste made in the twisting and the quality of yarn depends upon how carefully this process has been performed. The discs must be wound tight and straight so as to separate from each other easily. There are a number of slitters made in the United States, one of them being especially suitable for this industry.

TYPES OF TWISTERS

Three types of twisters are used for

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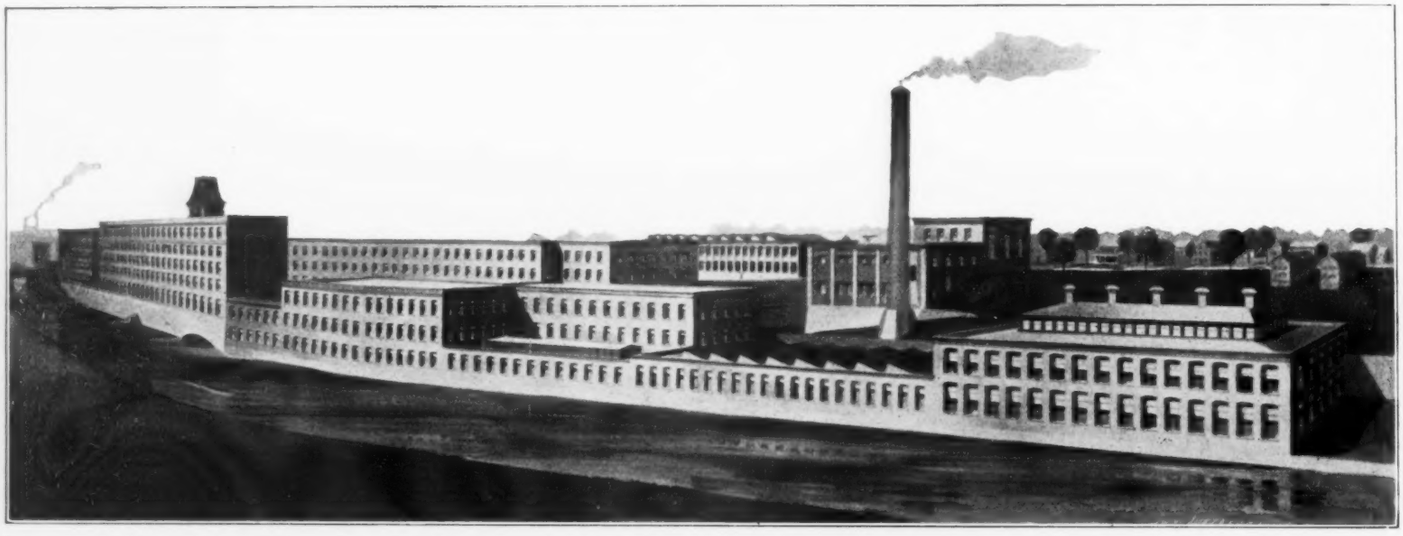

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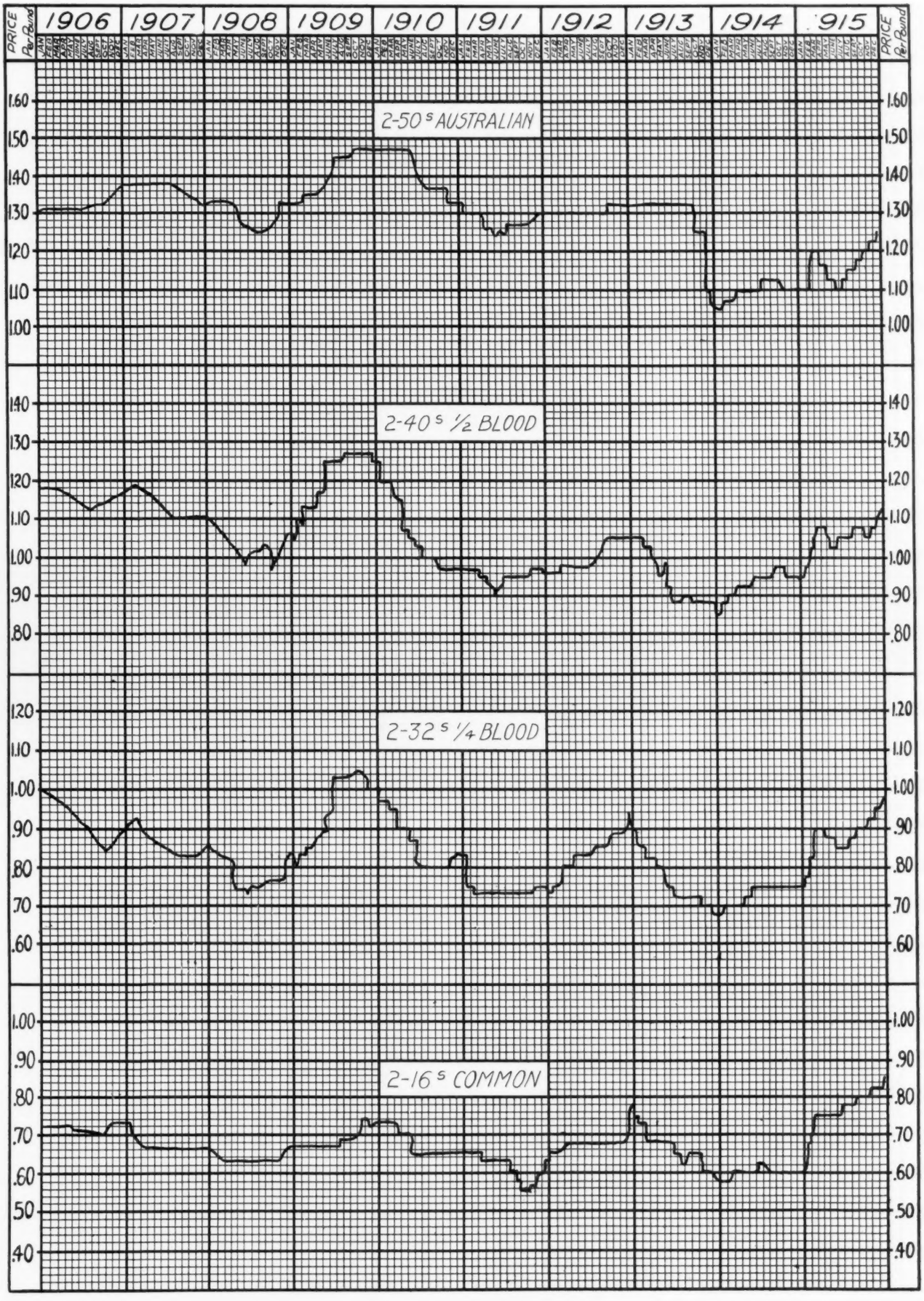

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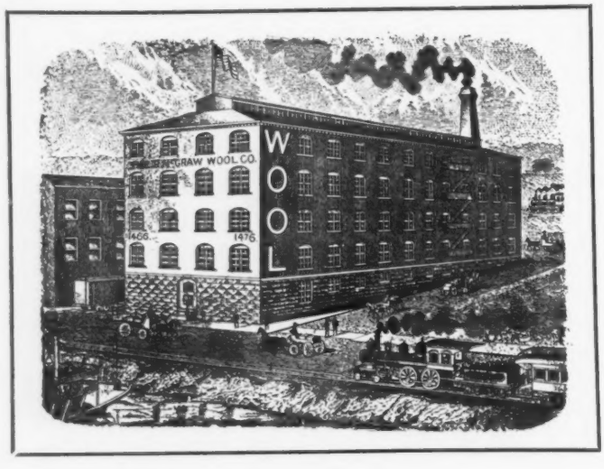

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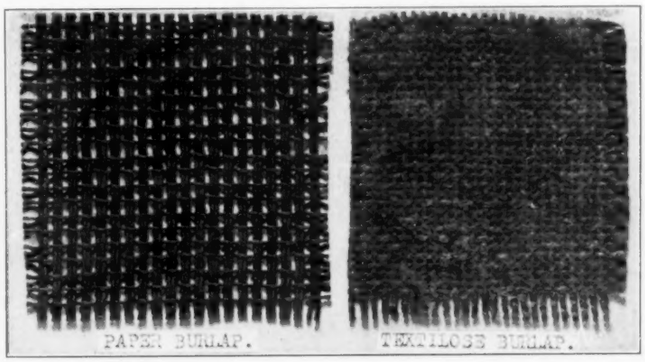
the paper twisting industry. First, the disc system, which is the distinct feature of the Claviez process where the disc coming from the slitting machine is put into flat holders, and the paper twisted by two small rolls placed above the disc and delivered to the spools. Second, the flyer system, which is used in most of the American and English machines. In detail construction these machines

may vary. In some makes the legs of the machines may vary. In some makes the legs of the machine are turned upwards and the feeding takes place from the bottom; while in others the flyer is in the usual position and the feeding takes place from the top. The tension in most cases is obtained with a weight and band against the spindle or bobbin flange, and in some cases a spring is employed for this purpose. All heavy yarns must be twisted on the flyer system. For fine yarns the ring system has been perfected and gives very good results.



CONDENSATION AND TENSION

The greatest problem confronting the constructor of paper twisting machines is not in the twisting operation itself but in the delivery, condensation and tension. Paper in the dry state, especially when cut into narrow strips, is an unelastic, harsh material. Commercial yarn cannot be made without proper tension, and this must be adjusted in proportion to the weight of the bobbin which, of course, increases in the process of filling up the spools. The next problem is the delivery of the paper strips to the twister without imparting too much tension, or too little. Since the process of drawing is eliminated, the paper strip goes direct to the delivery rolls, and to the guides of the twister, so there is still another factor of tension which requires consideration by the constructor.

If the tension on the spool is too great the yarn will break, and if not enough, the machine will produce an uneven, commercially valueless article. The tension must decrease in proportion to the size of the disc and the tension on the twister must increase in proportion to the diameter of the yarn thereon. As no machine has yet been built for such fine adjustment, a rigid overseeing is necessary. The paper strips are fed to most machines, flat, while on some they are condensed in a hollow tube turning the edges inward, thus reducing the possibilities of breakage.

DRY AND MOIST TWISTING

Yarns made of tissue and other thin paper are twisted either dry or moist, while heavy paper must be carried through a moistening device, softening the strip to make it more pliable for twisting. The Kron method differs from this procedure in that the cutting of the narrow strips is done right on the paper-making machine, thence carried into rubbing aprons similar to the ones used in wool carding, condensed into a round sliver, delivered in cans, kept in a moist condition, and then taken to the twister.

Universally moistening is done in a copper tank filled with water, behind the feed rolls, to which various preparations of salts and gummy materials are sometimes added to increase the pliability and strength of the finished product.

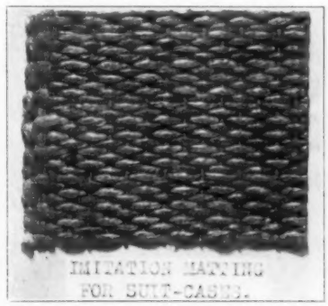
COMPARISON WITH OTHER MATERIALS

The greatest drawback in using paper yarn as a substitute for other materials is in its bulk, which often offsets the advantage of a lower price. The strength of paper yarn varies in proportion to the raw material and the twist imparted. The soft-twisted yarn made of tissue-paper cannot be compared in strength with jute or cotton yarns of the same bulk or diameter, while the hard-twisted Kraft or sulphite paper can successfully compete in strength with jute, but it is about twice as heavy, thus off setting the advantage. The success and market value of paper yarns and twines lies not as a substitute for jute, cotton or other textiles, but in their adaptability in fields where the other fibers have shown undesirable features.

TWINES FOR TYING WOOL

Paper twines for tying wool, instead of sisal or hemp, is an instance where success depends upon special fitness. Many hundred thousand pounds of paper twines are sold in a year for this purpose, and it will not be many years before they are universally adopted. Woolen manufacturers know that when a piece of sisal or jute is mixed in with the wool it will be carried through all operations with disastrous effect, while paper twine, if accidently mixed in the wool, will dissolve during the scouring process and be thrown out during the carding.

There have been no serious attempts made to make wool bags of paper fiber which would have the same distinct advantage as the wool twine; but surely the future will bring a worth-while article for this purpose. Other fields



where paper twines will be used successfully are the meat industry and tobacco packing. In spite of the fact that the industry is still in its infancy, quantities of paper yarn and rope are sold to the millinery and hat trade; for fuses in explosives, packing twines and reed substitutes. In the Middle West a large mill is making furniture, using paper fiber, with wire core, instead of reeds.

FUTURE OF AMERICAN YARNS

The future of paper twines in the United States is in the coarse and medium size numbers, since the manufacturing of fine sizes has proved prohibitively high with our labor cost. Japan produces a paper yarn to-day that can hardly be distinguished from combed Sea Island cotton in strength and uniformity, made of bamboo paper, but it is higher in price than Sea Island cotton. There is a greater future in the American market for paper fabrics than for paper twines, as in the latter the field is limited to a few specialties, while in fabrics there is absolutly no limit.

FLOOR COVERINGS

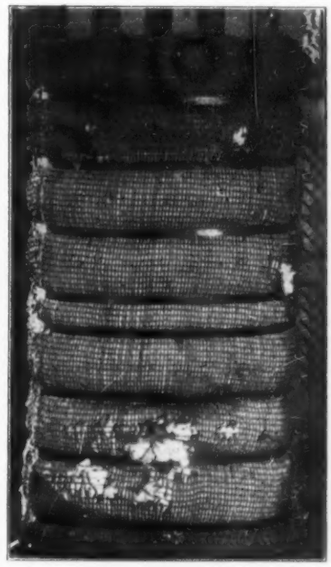
Fiber floor coverings manufacture, a truly American industry, is still in its infancy. There are no means of telling how it may develop. In the majority of paper floor coverings paper yarn is used as a filling with cotton or jute warp, in a half double fabric where one filling is a cheap shoddy, while the other is of a soft twisted tissue paper. Wonderful designs and effects can be obtained in these combinations, and a mill producing such articles was awarded a gold medal at the Panama Fair. Another method of using paper in floor coverings is with fine cotton warp, the filling is soft tissue paper beaten closely together. Such fabric in finer construction is also used for suit cases instead of Chinese matting. The objection to this kind of floor covering is that the warp wears out, and the soft paper filling consequently goes to pieces.

In the last few years an all-paper floor covering has been made by some mills where both warp and filling are paper and the designs are stenciled in oil colors similar to that of grass matting. Such all-paper floor coverings are usually made of kraft paper, are hard twisted, waterproof and very substantial, but yet have a certain matting appearance which makes them rather a substitute for matting, than an original article.

Recently a concern in the Middle West succeeded in producing a paper fiber carpet that has the softness and pliability of wool, elastic under foot, and a distinctly new departure from the usual article. The color effects are obtained by twisting the shades together on the four-ply basis, producing a soft mottled effect.

BAGGING AND BURLAP

While our paper fabric industry can count to-day a half-dozen mills producing floor covering exclusively, the bagging and burlap branch has fared with less success. It is very successful in Europe, but the high cost of manufacturing in the United States makes the competition difficult. This article was manufactured in New England but discontinued on account of lack of profits. On the other hand, another mill established about two years ago, is fairly successful in producing specialties, notably bags for the shipment of vegetables, and there are indications that there will be a future development.

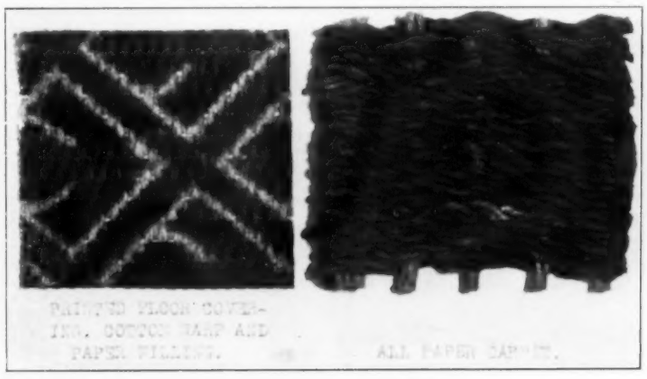


PAPER BAGGING AFTER A 3,000 MILE TRIP

The possibilities of paper fabric for cotton bales were demonstrated last year by an actual test when cotton bales, covered with a heavy paper fabric, especially constructed for this purpose, were sent on a three thousand mile trip, unloaded six times and arrived at the point of destination in excellent condition. The drawback in developing this field at present lies in the low price of gunny bagging. While all factors agree that the gunny sack is detrimental to the cotton, yet under present conditions the growers cannot be induced to adopt a superior wrapping at a higher price.

LESS INFLAMABLE THAN JUTE

The tests conducted with cotton bales proved the surprising fact that the packing made of paper fiber is far less inflamable than jute, and being a smooth fiber, the cotton will not adhere to it, causing little waste at the opening



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the bales. Paper fabric for cotton lling is a feature that will sooner or ater come to the front.

The articles that may be produced in woven paper fabrics are almost unlimited. While in the United States they are confined to floor coverings and a few specialties in baggings, Germany, England, Sweden and Japan have produced wall coverings, ribbons, quilting materials, towels with paper warp and linen or cotton filling, print cloth, especially for cretonne, upholstery goods with cotton warp and paper filling, horse hair cloth substitutes, carriage cloth, and many other articles, which have found their way to the market mostly in southern European countries.

INDUSTRY HAS COME TO STAY

An analysis of this industry in the United States proves that the paper textile industry has come to stay but its success will be entirely in different lines than that of the European mills. The American consumer can at any time afford a cotton towel or a silk and cotton ribbon, and under normal conditions it will not be necessary to turn to paper. The future of the American paper textile industry lies in the creation of new articles, and the development of paper floor covering indicates that the American branch of the industry will lead the world in new fields instead of substitutions.

The accompanying illustrations show a variety of paper textiles, all of which were made in the United States, excepting those where the place of manufacture is stated.

Finishing All-Wool and Union Cassimeres

By Oaramu

TO recommend hard and fast rules for the finishing of all-wool cassimeres and union cassimeres would be misleading, because it is well-known that changes must be made in the treatment of goods in the finishing room as a result of changes made in some other part of the mill. For this reason a finisher must always be on the alert for sudden changes and as soon as they are discovered the soap perhaps must be changed, or the fulling, scouring or gigging processes modified so that when the goods are finished they will match goods finished previously.

The following are some of the many causes responsible for a great deal of the trouble in the finishing room: The stock may be changed; the oil in the mixing house may be heavier or lighter in body, or it may be of a different composition than the oil previously used, or it may be harder to saponify, or it may saponify more easily. The dye may be changed or perhaps more twist put into the yarn. Any of these changes may seriously affect the fulling, scouring and gigging of the goods. More twist will make the goods full longer and also help to darken the shade. They will clear out easier on the gig because the thread is more round, firmer and a little less felted.

FULLING

Let us send four pieces of all-wool cassimeres and four pieces of union cassimeres to the burling room. After careful burling and sewing the goods are ready for the fulling mills. Run the four pieces of 6/4 all-wool goods in the first fulling mill, two pieces on each side single. On the end of each piece a yard has been marked off with tapes to indicate the shrinkage. Run the four pieces of union cassimere, also 6/4 goods, in the second fulling mill, two pieces on each side doubled. The unions are composed of two threads of black cotton to one thread of wool in the warp, 20 per cent. wool, 80 per cent. shoddy and cotton in the filling.

The unions are run in double because of the inferior quality of the stock. In this way more pressure is used on the goods from the top fulling roll and the pieces make two revolutions to one for the all-wool cassimeres and warm up more quickly on this account.

Soap the goods in the first fulling mill with a soap composed of 9 ounces palm oil soap and 3½ ounces ammoniated potash to each gallon. Soap up the union cassimeres with a soap composed of 4½ ounces palm oil soap and 3½ ounces ammoniated potash to the gallon. The wool cassimeres are to shrink a good 8 per cent., or 3 inches to the yard in length. This will mean a loss of about three yards on 36 yards. Put a small weight on the trap. The unions will stretch a little, so no trap should be put on them because it only wastes the goods by chafing and all tendency to chafe should be avoided. Add a little soap frequently to both mills. This is one of the best ways to keep the colors bright and to give the goods a natural luster. Close the doors and the covers on the first mill and close the doors of the mill containing the unions, but leave the covers up as they will warm up quickly anyway. Open the covers on the first mill as soon as the pieces get warm. After 2½ hours fulling the union cassimeres are shrunk to 56 inches in width, and in 3½ hours the all wool cassimeres are 57 inches in width and 3 inches up in length per yard. The goods are to finish 56 inches wide. The all-wool cassimeres are taken out at 57 inches, allowing one inch for take-up in the washer.

SOAP FOR UNION AND ALL-WOOL GOODS

It will be noticed that the soap used on the unions is only half the body or consistency of the soap used on the all-wool suitings. Also it is more alkaline, because there is less pure soap in it. This formula is prescribed because it offers less resistance to the combining and felting together of the fibers and hastens as far as practical the fulling process. For an illustration, we will suppose that a heavy bodied soap was used on the union goods and a light bodied soap on the all-wool goods. The following would result: The unions would full too long and perhaps would not come up to 56 inches. They might run four hours instead of 2½ hours. The result would be dulled colors and tender goods. It must be understood that on account of the unions being doubled up in the mills, 2½ hours in equal to 5 hours fulling and 4 hours would mean the equal of 8 hours fulling of goods run single, which would be very excessive. With the all-wool goods the result would be the reverse. They would shrink too fast and the felt would not be obtained and a sleazy piece of goods would be produced. The three inches shrunk in length would likely pull out again in the washer and other machines which they must pass through. I have compared these two fabrics to prove that the formula which produces a good healthy fabric in one case will ruin the other.

WASHING ALL-WOOL GOODS

The goods are now ready to be washed. Run the four pieces of wool cassimere suitings into the washer. Put on a little warm water at about 115° F. If the soap looks very dirty, fill the washer up with the warm water, having the gates closed. Shut off the water and open the gates, letting the dirty water run out. Close the gates again and run in a few inches of water. Shut off the water and run the goods for about 20 minutes. Turn on the warm water again, letting it run 20 minutes, working the gates or outlets in such a way that the washer will be about three-quarters full while the water is running in and out. Then shut off the water and let drain. When this is done close the gates and add six pails of the heavy fulling soap. Run 30 minutes. The lather now should be pure white. Again turn on the warm water at 115° F. as before. Run the goods in this until the soap has all disappeared. When the water is perfectly clear test to see that every particle of soap has been rinsed out. Do this by clasping the piece in the hand while it is running. If it still feels slippery keep the water running until a rough feel is obtained. Shut off the warm water and turn on the cold for 15 minutes more.

These goods are not to be bur dyed, but as the colors required are to be bright and snappy they should be given a sour bath, leaving enough cold water in the washer to partly cover the goods. To half a barrel of water add one quart of sulphuric acid. Stir well and pour into the washer with a pail, running same from side to side of the washer to distribute as evenly as possible. Run 20 minutes and rinse off 15 minutes with cold water, then take the goods out and send to the extractor.

WASHING UNION GOODS

The unions should be washed the same way, using the same soap they were fulled in with the warm water reduced to 100° F., and instead of running in warm water until the soap is all out of the goods, as in the case of the wool cassimeres, run in warm water only 20 minutes and in cold water 45 minutes. Cold water has a more softening effect on the cotton than warm water. Drain off the cold water, leaving only that retained by the goods.

Now close the gates and put in the bur dye. As these dyes are used according to dyehouse directions the amount to use must be governed by whatever formula is being used. After the goods have run in the dye for 20 to 30 minutes turn on the cold water, letting it run until the water is perfectly clear. Take out the goods and send to the extractor.

GIGGING

The goods should still be wet, because they have yet to be gigged. Fold out of extractor and have the four all-wool pieces wound tightly on wooden rolls and let stand at least three hours. Take the four unions to the teasle gig, which is a double cylinder machine, and with medium work, that is, teasles that have been used a little but are not too sharp, set the cloth up so it will touch lightly for two runs, then set a little closer for four runs more. Turn up the nap with the blade of a pocket knife and see if it is nearly gigged to sample. The rest must be judged by the finisher, but as the two cylinders are running in opposite directions it is well to have the last two or three runs with both cylinders running in the same direction to lay the nap nicely.

After the wool cassimeres have laid long enough to take out machine wrinkles, unwind from rolls and put on the gig. Fill both cylinders with old work and give five runs. Take out the old work and put in the medium work, giving five runs more. Set up closer and give five runs more. Take out every third slat and put in sharp work in both cylinders. Let the cloth off a little and give a few runs. Watch to see how the gigging is progressing and if nearly completed turn over the slats in the first cylinder and run both cylinders in the same direction for two or three runs. While the gigging is in progress the goods should be sprinkled with water. This keeps the nap from being torn out, besides giving a transparent finish.

SHEARING

The goods should be extracted well for the drying machine and dried at 57½ inches. This will leave an inch and a half for take-up in steaming and pressing. After drying give a good steam brushing on the face to loosen up the nap which the drying has matted down. After the goods have been back burled to remove any lumps, knots or purls that may be on the back, they are put on the shear with the back up. One or two runs are enough for the back. Turn the goods to shear the face, bringing the sewing up and just over the edge of the rest. Now set the raising and the laying brushes on so that they will both raise and lay the nap well, raising the nap from the bottom to an erect position so the blades can cut it off evenly. Set the shear blades off so that they will just trim the tops, letting down the notches about two at each run until nearly finished. Compare the goods with the sample and give about three runs on the last notch. This applies to both fabrics.

The unions now pass on to the press. The wool cassimeres are sent to the speckers and if any threads have been left out the speckers report it and the fine drawer fixes such imperfections, after which the pieces are pressed well and given a little steam from the back sponger on the press. As the cloth leaves that machine after being examined and allowances for imperfections made, it is measured and rolled, and is ready for the market.

Affinity of Fibers in Mixtures

By Nilo

IN the combining of different kinds of stock there is nothing more important than a uniformity of quality, which means an affinity of fibers that is always necessary to the best results. This affinity means not only the best working condition of the mixture, but the greatest economy and the best possible results in the finished fabric.

PRICE GIVEN UNDUE CONSIDERATION.

In the selection of any wool substitute the matter of first cost is too often considered, without due thought as to the possibilities attending the use of a better grade, the working conditions, or the final result. In attempting to keep down the cost of a mixture, a "penny wise and pound foolish" policy often leads to defeat of the end in view.

First of all the affinity of fibers should be considered; for it is utterly impossible to obtain the best results, either in manipulation, economy or finished results, if there be a wide variation in the quality of the different kinds of stock used in the combination. Where a fine wool is used, the shoddy should be equally fine to insure good working conditions and perfect yarn. While for spinning quality, the length of the staple is important, the quality is even more important to the finished cloth. Where the shoddy is coarser than the wool with which it is combined, the cloth will have a coarse appearance and "feel" in proportion to the percentage used, while a uniform quality will give uniform results regardless of the amount used.

In the matter of economy, there is often a misconception of the value of stock because one judges from the price rather than from the possible results to

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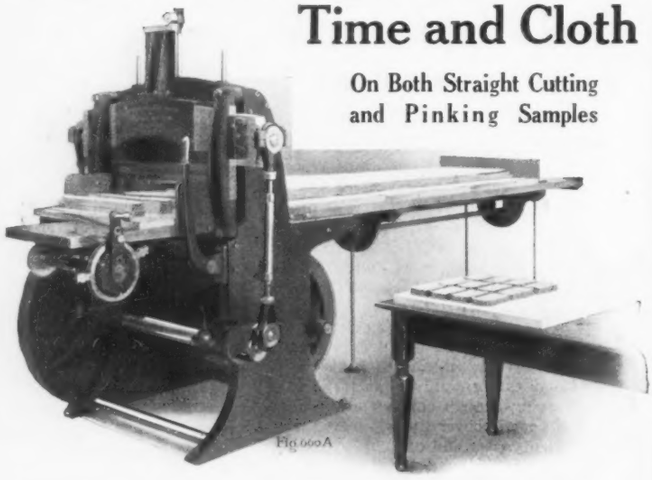

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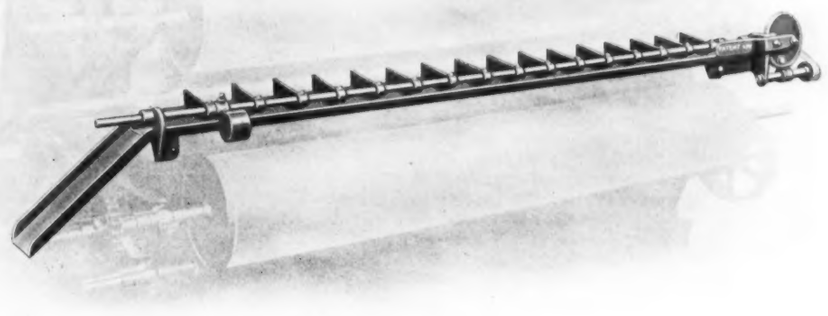

We offer you another **American made** machine which, according to those who know its advantages is a necessity in every card room.

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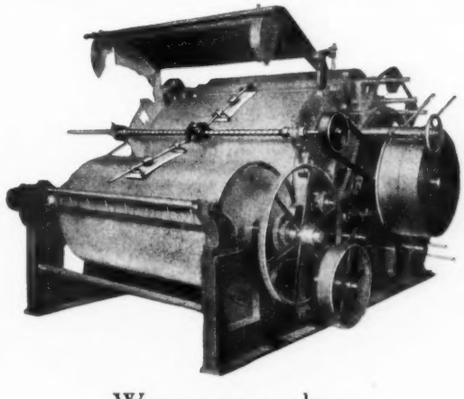

You can reverse our Grinder at any point of the spindle

Strickle Automatically and Uniformly!

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Card Mounting Apparatus and **Grinding Rollers**

The Lehnert Textile Co. Boston, Mass.

Office: 184 Summer Street

Factory: 58 Kemble Street, Roxbury, Mass.

be secured. The best is not only the cheapest in the end, but at the start if one properly considers the possibilities attending. Of stock that is exactly adapted, it is often possible to use a sufficiently larger percentage of the right kind of lower grade in the mixture to more than offset the difference in cost.

The writer was once called to take charge of a mill making hairlines. Every practical man knows how important it is to have perfect yarn on this class of goods. The yarn was 4 and 4½ runs, made from fine Territory wool and a shoddy that was entirely unfit to combine with it. The wool cost 56 cents and the shoddy 14 cents, and they were using 20 per cent. of the latter, making the cost of the mixture 47.6 cents per pound. The proprietor said they had tried to increase the amount of shoddy, but without good results. I told him the shoddy was too coarse, and suggested a change to better shoddy, but he said he could not afford to use any more expensive stock, as it would make the cost of the goods too high. I asked him if he was willing for me to try a better grade of stock if I would not increase the cost of the cloth. Of course he assented, but could not see how a higher priced stock could be profitably used. I secured some fine merino stock at 20 cents per pound and made a mixture using 75 per cent. of the wool at 56 cents and 25 per cent. of the new stock at 20 cents, which made the cost of the mixture just 47 cents—6/10 of a cent less than that being used.

The cloth made from this mixture was better felted, felt much softer and showed no signs of uneven or twitty yarn that had characterized the goods made from the old mixture. I afterward increased the percentage of shoddy in the filling to 30 per cent., thus making the cost 45.2 cents, and the average cost of both my mixtures 46.1 cents, or 1½ cents less than the first mixture, with further advantages in the reduction in waste and improvement in the cloth. The 14-cent shoddy was all right to combine with a coarser wool, and for yarn of 3-run or coarser, but it was entirely out of place for the use they were making of it.

The difficulty above referred to is not confined to the use of wool and shoddy, for I have seen similar trouble where the stock was all wool. I recall a case where the goods were made tender from wrong treatment in the finishing, and the superintendent, not knowing the cause, thought to strengthen the yarn by adding 15 per cent. of coarse wool. These goods were also hairlines, and the twitty yarn that resulted proved a serious difficulty.

In combining wool and cotton the quality of the wool has much to do with the result in finishing. Since the cotton does not vary so much in quality, it becomes necessary to adapt the wool to the cotton, and a fine quality of wool gives the best results. Coarse wool lacks in felting quality, and results in a raw, open effect and cottony feel. Fine, short wool, because of its fulling quality and multiplicity of fibers, brings the wool to the surface in the fulling process, covering the cotton and producing a soft, wooly feel that is most desirable.

Where the wool is short and fine the goods may be laid reasonably wide in the loom, and the fulling is easily accomplished; but if there is a lack of fulling capacity, care should be taken to avoid getting into trouble in the fulling process. I have produced goods containing 40 per cent of cotton, and laid them 75 inches wide in the loom, with good results, because the wool was of excellent felting quality, while I have seen goods only 64 inches wide, that could not be fulled to the desired width.

WOOL CARDING

(*Continued from page* 154)

used as to the amount that any given stock may be drawn as an excessive stretch in spinning will inevitably result in a weak thread.

Production may be increased at times by increasing the speed of the cards, but unless a stock that will warrant such increase is to be run for a considerable period, it would not be profitable to incur the necessary outlay of time, labor and expense. It is entirely feasible in such a case to increase the speed of the ring doffers by placing leather lagging on the driving pulley, and when this is done the weight of the feed must be increased in the same proportion. Stocks that are inclined to lie close and offer considerable resistance to the carding action of the machines offer serious objection to such a procedure, as, in order to secure the complete mixing and thorough opening that is essential to the manufacture of strong, elastic yarn, the carding must not be crowded with stock or the results will be far from satisfactory.

SIZE OF WIRE.

The condition of the clothing and size of the wire are important factors in determining the quality of the roving. The fine wire required for the proper handling of fine close wools is naturally not as effective for the manipulation of coarser wools and low-grade stocks, but under present-day conditions with the rapid style changes, the carder is frequently compelled to change from fine to coarse stocks at a moment's notice, using the same cards for the making of two-run yarn from coarse stock one day and five-run yarn from stock of an entirely different character the following day. Under such conditions it becomes imperative for the carder to manipulate his machinery to the best advantage and to fit it with clothing capable of handling both grades of stock, though possibly not that best adapted for working either. By a careful regulation of drafts and speeds it is possible to obtain very satisfactory results, although it entails a greater effort on the part of the carder.

There is much difference of opinion as to best methods of clothing the cards where a great variation in the stock is likely to occur, but experience has proved to the writer that clothing the first breaker cylinder and workers, strippers and doffer with No. 30 wire and the finisher with No. 32 wire, will give the most satisfactory results on these various stocks. The tumblers should have wire one or two numbers coarser; the fancy, wire one number coarser than the cylinder; the feed rolls covered with diamond pointed wire not finer than 22, or with duplex wire.

One of the most important details in the card room is the setting of the various parts in relation to the others, and nothing should induce the carder to neglect this or to slight it by hurrying if the mule should be obliged to wait for roving. The setting of the finisher is perhaps the most particular item and a description of the methods there employed will answer as a guide for the setting of the balance of the set.

SETTINGS AND SPEEDS

The tumbler should be set to the cylinder with a 30 gauge and the leader to the tumbler as closely as it may be operated without striking. The back fancy should engage the teeth of the leader about 1/32 to 1/16 of an inch and be set to the tumbler with a 28 gauge. This fancy should have a surface speed of 2½ or 3 to 2 of the leader, insuring a free delivery of stock from the leader to the tumbler and also maintain the leader in good condition, sharp and clean. Next set the feed rolls as close to the leader as they can run with safety and as close together as may be, in order to avoid any possibility of the stock being drawn through in flakes. Set the workers to the cylinder with a 30 gauge and strippers to workers with the same, running them as close to the cylinder as they can be operated without contact.

The utmost care must be observed in the setting of the ring doffers as cutting too close to the cylinder will have the effect of imbedding the stock in the wire to such an extent that it cannot be easily taken off by the corduroy covered wipe rolls, and in addition will cause sliver and other impurities to stick to the rings as well as causing imperfect roving. The ideal setting of the ring doffers is that which removes the stock from the cylinder, laying it nicely on the rings in position to be taken therefrom by the wipe rolls and delivered to the condenser.

The wipe rolls should be set to doffers and condenser with a 30 gauge using the same gauge for the rolls or aprons as the case may be, vibrating the aprons one inch. Should the roving be condensed too hard, the setting may be increased, the vibration shortened or the speed decreased.

Nothing has been said as to the setting of the fancy. This roll has no carding action whatever, its function being simply to raise the stock to the points of the cylinder teeth in position to be engaged by the doffers. The speed of the fancy will vary with the character of the stock as also will the setting. A satisfactory speed under most conditions will be 12 inches of fancy surface to 10 inches of cylinder. A very simple manner of determining relative speeds is to mark both cylinder and fancy at the point of contact, marking a point 12 inches away on the cylinder. Turn the cylinder until the fancy has made a complete revolution and if the speed is correct the marks on fancy and cylinder will exactly coincide. Any variation may be easily corrected by adding or removing lags on the driving pulley of the fancy. The fancy should be set into the cylinder wire from 1/64 to 1/32 of an inch. It should be unnecessary to state that all setting should be made with the belts on in operating position.

CAUSES OF TWITS

Twits may be caused by the card, the stock or by the methods of handling the stock in the preparatory processes. As soon as they are discovered the carder should at once take the necessary steps to remedy the difficulty if within his power. They may be and are frequently due to excessive draft between the aprons of the condenser or by dirty aprons. In such cases the remedy is obvious. They may be due to insufficient rubbing or excessive speed, particularly of the ring doffers, or to some defect in the rings. These must be kept smooth and sharp at all times. It may be that the wipe rolls are speeded too high or that they require a new covering. If not due to any of these causes above mentioned the condition of the stock should be examined as well as the front of the card.

It is very evident that stock which is not properly delivered to the card cannot be brought out in first-class condition. A licker-in that is not functioning correctly may be the source of the trouble, and the settings should be examined to see that there is no possibility of the stock entering the card in bunches, which will invariably show in twits. In but rare instances can this defect be traced to a defective cylinder, although sometimes it will be found that the clothing has "blistered" or become loose in spots through stretching of the sheet or fillet. In this case the only safe remedy is to dismount the top work and redraw the clothing, any other method being simply a makeshift. Tacking down the blister is never productive of good results, and should never be resorted to unless the condition of the clothing is such that redrawing would probably result in disaster to the sheets. The fancy may also cause twits because of improper speed, condition, or setting.

CAUSES OF UNEVEN ROVING

The causes of uneven roving, the next most prevalent defect in carding, are numerous and varied. Sometimes the trouble shows up as coarse or heavy ends at one or both sides of the card. In this case it may usually be traced to maladjustment of the feeding mechanism, the carrier making too long or too short a traverse. This trouble is very readily corrected, but there are other causes of uneven roving that are neither as readily located nor as easily remedied. Light ends on one spool, with the corresponding ends heavy on the other, are due to improper setting of the doffers, as is the case when the ends vary regularly in size from side to side of the card, one end being in closer contact than the other. In either of these cases the remedy is to adjust the settings.

Excessive speed of the carrier of the feeding mechanism may give light side ends, due to the drag on the drawing, reducing the size of either end of the traverse of the carrier, or it may be due to an ill-advised effort to save waste by shortening the traverse too much. Poor condition of the clothing on feed rolls, licker-in or tumbler may be the source of the trouble, as if the wire is dull, hooked or bent, it cannot perform its work properly, and the stock will pass to the cylinder in bunches. Worn gears on the feed rolls or rolls that are sprung will also result in uneven roving.

DUTIES OF THE CARDER

Other duties of the carder, aside from the production of sound, spinnable roving, are keeping the room and machinery in first-class order, suitable records of cost and production, and last, although not in importance, maintaining the waste at the lowest possible percentage. Attention to speeds, cleanliness of the machinery and good discipline will materially assist in this regard. A fancy speeded too high will invariably cause excessive fly waste and necessitate more frequent wiping down of the machine. Care as to the oilings, in frequency and amount used, must also be observed. The floors kept clean and the soft waste returned to the feed box at frequent intervals, so that the latter part of the lot will not be compelled to carry an excess of waste.

Stripping is a necessary part of card room work, but should not be undertaken with undue frequency, although the reverse is also true as a card that is dirty cannot perform its work properly. The use of automatic feeds throughout, as is the practice in all modern mills, necessitates the stopping of the entire set until all are cleaned, so that a considerable loss of production will occur if the work is not promptly performed. If the size of the mill will permit the employment of four strippers, it would be advisable for them to work on one set at a time, so that the stoppage may be as short as is consistent with good work. With cards properly clothed and kept in good condition and stock of a character suitable for the work in hand, the skilled carder will have comparatively little trouble in turning off an excellent production of first-class roving at a relatively low unit cost.

Phenomenal Year Evident in World's Wool Markets

Foreign Wools Dominate a Phenomenal Year

Embargo Rumors and Facts Keep Market Under Tension

THE domestic wool trade experienced a period of unusual and unexpected developments during the year 1915. War conditions prevailed to such an extent, and dominated the market so completely, that all precedents were set at naught, and many of the ordinary methods of transacting business had to be laid aside. Taken as a whole, however, the trade has had one of the most successful years in its history, and it is common talk on the Street that the profits of the leading houses have been sufficient to recoup them for several lean years. These profits have not been secured without strenuous endeavor, and sometimes only by taking chances deprecated by the more conservative members of the trade. It has been a year when good merchandizing ability has been an asset of the utmost importance, and it speaks volumes for the character of the wool trade, that in spite of the difficulties brought by the war, the year closes with everything in a highly prosperous condition.

It detracts nothing from the above statement to say that trading in foreign wools has been the most prominent feature of the year's business, and that consequently profitable employment of capital has been along that line, in many cases to the exclusion of domestic wools. This emphasizes the fact that new precedents have been established, and that wool men have been obliged to proceed along unfamiliar lines. This is notably the case in the requirements of the British Government that all shipments of wool from the United Kingdom and the Colonies to the United States should be made under the auspices of the Textile Alliance. Indeed, the development of this factor in the wool trade is easily the most striking event of the year. Though at first the idea was obnoxious to many of the members of the trade, especially to those with financial standing and well-established foreign connections, experience has proved the plan feasible and practicable, with much less friction than was feared.

RECORD IMPORTS OF WOOL

Old timers think it little less than marvelous that the trade should have been able to absorb so much foreign wool after so long a period of uncertainty in the wool manufacturing industry as existed throughout the greater part of the first half of 1915. Receipts of over 237,000,000 pounds to Dec. 22 indicate that 1915 will hold the record in this particular. It is necessary to go back to 1897 to find the previous record year, the total receipts of foreign wools at Boston in that year being 193,000,000 pounds. Total receipts of foreign wool at Boston for each year since 1904, as compiled at the Boston Chamber of Commerce, are as follows:

Year	Pounds.
1904	153,033,538
1905	106,781,301
1906	96,212,199
1907	76,097,317
1908	149,487,123
1909	81,173,849
1910	67,759,223
1911	124,143,652
1912	63,336,325
1913	144,145,491
1914	237,322,022
1915*	

* To Dec. 22.

Other salient points in the year's wool history have been the exportation of a moderate volume of both foreign and domestic wool early in the year; the lifting of the various embargoes in London, Australia and New Zealand; the speculative excitement in domestic B super wools, and the sharp advance in prices of pulled and other wools. Altogether, 1915 has been full of interest, but at no time free from anxiety, nor uncertainty as to what might be the next development in the markets of the world.

SMALL STOCKS WHEN YEAR OPENED

Stocks of wool unsold in Boston at the beginning of the year were only 28,340,308 pounds, (compared with 43,800,549 pounds at the beginning of the previous year and 42,849,855 pounds at the beginning of 1913. Efforts to reduce stocks during the latter part of 1914 had been eminently successful, and from the standpoint of supplies, conditions were favorable. Stocks of foreign wool were particularly small, due principally to the embargo placed on exports to this country by the British Government. This was considered a strong point in the trade, and though efforts had been made in the closing days of 1914 to secure the lifting of the embargo, or at least some modification of its restrictions, there was still great uncertainty at the beginning of the year.

THE SPECULATION IN PULLED WOOLS

Foreign army contracts were responsible for the big speculative movement in pulled wools, especially B supers, which began in the latter part of 1914 and lasted into the following February. Around the first of December Eastern pullings were selling at 48 to 52c. for B supers, and by the beginning of the year were selling at 57 to 60c. By the middle of February the quotation for Eastern B supers was 68 to 70c., with some holders refusing to sell except at the outside figure. Some small lots were sold to manufacturers as high as 70c., and dealers paid well up to this figure for lots to sell again. Higher prices still were predicted and previous profits were eagerly reinvested in other lots of the same grade. Prices were finally run up to a point where manufacturers could no longer afford to buy these wools, even to use in filling the highly profitable foreign contracts. Efforts were made to find substitutes, and for a time anything that had the required staple and could be called wool met with ready sale. Completion of existing contracts, which were not renewed, tended to decrease interest in pulled wools, and in March a reaction began, which lasted until June. The low point was touched in May, when ordinary B supers were offered freely at 57 to 58c., and some speculative buying was reported at the lower figures. Since that time the market has been somewhat erratic for pulled wools, but generally tending upward. Current quotation for B supers is 62 to 63c., though some holders are asking as high as 65c. for choice Eastern Bs.

Current comment in Febrary was that the speculators were hit hard by the decline in B supers. Some holders were

(*Continued on page* 175)

Carpet Wools Find New Uses

Embargo on Crossbreds Compels Woolen Mills to Seek Substitutes

CONDITIONS in the carpet wool market during the past year have been the most peculiar ever experienced by the trade, with many types and grades absolutely unobtainable at any price, due to war conditions and embargos by the various beligerents. As a result of England's entry into the war not only were British and British Colonial wools denied to our manufacturers but imports of South American wools were seriously interfered with as under normal conditions London is the chief trading center for the clip of the Argentine. In addition to this dealers in the domestic market were very seriously affected by the dearth of shipping facilities, there being relatively few lines operating directly between our ports and those of South America. Of these some are directly under British control and were transferred in their operation by the withdrawal of some of these vessels for military use as transports.

EMBARGO'S EFFECT

The British embargo was so strict that wools purchased previous to its going into effect were not permitted to leave the country, seriously affecting the domestic situation. It was well into January before any of the wool purchased months before appeared in our markets, the first small shipments coming forward on Jan. 17. It was anticipated that Scotch Black Faced and East Indias would also be released as these were not considered available for military purposes, but none of these were allowed to leave the country until well into March when the first arrival of Scotch Black Faced appeared in the market. Efforts were put forth to bring in the Russian and Trans-Caspian Wools, but these proved largely ineffectual, though early in February a limited quantity of Mongolian was received via Vladivostock.

TEXTILE ALLIANCE

One of the most important features of the early part of the year was the formation of the Textile Alliance, and the eminently successful manner in which this body dealt with the wool importing situation. There was no little criticism of the Alliance plan at first from wool dealers and manufacturers, but as the scheme became better understood and its methods of operation were fully developed, it was found to be a practical solution of a difficult problem.

Under the terms of the agreement made by the Alliance with the British Government, the importation of wool was much facilitated and the market stabilized, shipments came forward with greater freedom and all danger of a wool shortage was removed. Speculation among dealers, the most talked of features of the trade for some weeks, was brought to an end and the entire market resumed a more normal condition. There is every reason to believe that it is largely due to the efforts of this organization that the threatened acute condition in the wool trade was avoided and manufacturers were enabled to secure their supplies of raw material with a minimum of difficulty.

SCOTCH BLACK FACED ARRIVES

The first shipment of Scotch Black Faced under the auspices of the Alliance was received in the domestic market on March 6. Stocks of carpet wools in dealers' hands were at such a low ebb that the entry of one of our large mills to purchase a normal quantity would have cleaned up the entire market. Representatives of some of the larger factors in the trade made trips to foreign markets with a view to securing supplies that were unobtainable here. Were it not for the fact that many of the carpet mills were operating on a short time basis, the stocks would have been much more rapidly depleted. A peculiar feature of the market was the fact that even with scanty purchases by carpet manufacturers, stocks were being rapidly absorbed by mills.

NEW USES FOR CARPET WOOLS

It is entirely safe to say that for extended periods much larger quantities of so-called carpet wools were purchased by manufacturers of woolens than were taken by the carpet trade. This anomalous condition of affairs was the direct result of the embargo on foreign crossbreds and the relative scarcity of wools of this type because of their abnormal use in the production of military cloths and blankets. Manufacturers having contracts for these materials were forced to seek for wools that could be made to take the place of the crossbreds usually employed and at once turned to carpet wools, paying in many cases much more than the carpet manufacturer could afford to offer.

Large quantities of Chinas were taken out of the market for use in cloakings and blankets that normally would have gone into carpets, so that when carpet mills were ready to purchase, the markets were practically bare and in some instances operations were suspended from lack of raw material. The difficulties of dealers were increased by the commandeering by Russia of wools bought and paid for and in more than one case on shipboard in her harbors. The situaton was somewhat relieved by further shipments of Scotch Black Faced, July seeing 10,000,000 pounds offered in the domestic market. The release of East Indias in August also materially assisted in easing up the situation, one large concern alone purchasing 5,000 bales.

CHINAS ARRIVE SLOWLY

Shipments of Chinas have been delayed more or less because of lack of shipping facilities, contracts frequently stipulating that ninety days must be allowed for securing bottoms, a condition that is somewhat improved at present, though in the majority of cases sixty days are asked for even now. The high prices which have prevailed for some months may be affected to some extent by the recent arrivals of goodly quantities of East Indias and the imminent arrival of further quantities purchased at the December sales.

FRANCIS WILLEY & COMPANY

Wool Importers and Top Makers

Boston, Mass.
300 Summer Street

Philadelphia, Pa.
21 & 23 So. Second Street

ALSO AT BRADFORD, ENGLAND

DOMESTIC WOOL REVIEW

(*Continued from page* 173)

disposed to blame the large buyers of territory wool for unduly depressing values in order that they might secure the new clip territory wool on a lower basis, but the best opinion in the trade was that there was no ground for such a charge. On the other hand, manufacturers were blamed for unduly parading their possession of foreign contracts, and thus advertising their necessities in the way of low pulled wools.

Ostensibly the sole reason for the embargo was the fear that some of the Colonial wools shipped to this country might find their way to Germany, either in the raw or manufactured state. January was a practical repetition of December, with the embargo off or on according to the day or the temper of the British authorities. That they were making genuine effort to secure a working basis for exports of merino wools to this country was shown by the announcement around the first of the year that "shipments of merino wools to America would be allowed where the buyers would guarantee that the wools should not be re-exported, and would furnish a cash security in the sum of £50 minimum and £250 maximum." It was further provided that buyers of such wools "must ship in British ships."

Boston wool men were slow to accept any statements from London or Australia regarding the shipment of merinos to this country. The authorities had backed and filled so many times that there was a general disposition to wait for something definite. Some importers went ahead, however, and bought wools freely, securing a heavy-weight of various grades. Not only did they buy the class of fine wools usually considered suitable for America, but some of them dipped heavily into the inferior and faulty wools, such as usually had been taken by German buyers.

EFFORTS TO RAISE EMBARGO

The first concession as outlined above regarding Colonial wools seemed liberal enough, but its sting lay in the provision regarding shipment in British ships. As there were few vessels available to come to this country direct, and shipment to England would mean that the wool would come under the operation of the embargo in the United Kingdom, still rigidly enforced, the concession was more apparent than real. Still, enough encouragement was felt over the situation to induce free buying in Australia, while at the January series of the London sales, American bids were filed, as it was considered probable that England would follow Australia in a modification of the terms of the embargo. At that time it was reported that there were 60,000 applications on file for permits to ship wool, raw or in process, from Great Britain.

That progress was being made in the raising of the embargo was proven by the fact that the latter part of January saw permits actually secured by Boston parties to ship wool from Australia. Opinion differed in the trade as to the good faith and intentions of the British authorities, but houses of approved standing, with reliable connections in the Colonies were confident they would have no trouble in getting out a moderate amount of wool. However confident they may have been, they proceeded with due caution, and buying brokers and agents in Australia were careful not to guarantee the safe arrival of any wool bought. They promised to buy the wool and use all diligence to have it shipped, but this was as far as they would go. It was felt that England might renew the embargo at any moment if it was felt to be necessary as a war measure.

WOOL ON CONTRABAND LIST

At this time the situation was complicated by the case of the American steamer Carolyn, which carried a cargo of wool from Boston to Bremen. Wool had not yet been declared contraband by the Allies, and after a long delay the vessel was allowed to proceed to Bremen. It was reported that there were nearly 3,000,000 pounds more of wool in this market which had been bought for German account. Much of this was shipped later on the American steamer J. L. Luckenbach to Bremen. England rightly held that this discredited the plea of America that there was a real shortage of wool in this country owing to the embargo, this being the point most frequently urged by Washington in the argument against it. It was predicted that England would finally be obliged to declare wool contraband, which action was finally taken. It was also pointed out "that the plea of American manufacturers and dealers that wool is urgently needed here to prevent the mills of New England from closing falls to the ground when two or three million pounds can be sent to Germany in this way. It is feared that England may refuse to pour wool into the sieve which lets the surplus flow through to defeat the whole purpose of the embargo."

January closed with the prospects of getting merinos from Australia much brighter, and with some shipments actually under way via London or Vancouver. So much encouragement was found in the situation that American buyers were reported to be keen bidders at Melbourne and Sydney in the last days of the month for wools suitable for this country. Prices continued to advance in those markets under the influence of this bidding, but the shipment of wool by the steamer J. L. Luckenbach had an immediate and serious effect as predicted. On Feb. 5 it was announced that the Australian Government had reimposed embargo conditions on shipments of merino wools. As was remarked at the time, "it may seem like a cute trick to sell the domestic clip to Germany and then turn to Australia to make up the deficiency," but as usual England had the last word.

This announcement was followed by a wild scramble for wool in the Boston market, and the most excited market since 1879. Lots of wool were sold and resold several times, in each case at an advance until they finally came to rest in mill storehouse or speculative dealer's loft. Reimposition of the embargo was affirmed and denied almost in the same breath, but the holding up of the cargo of the steamer Lord Erne, already loaded to sail direct to Boston via the Panama Canal, seemed to be conclusive. One thing was assured, no one identified with the shipments of wool to Germany would be likely to get any wool out of Australia, except under the most rigid guarantees. Consternation ruled for a time in importing circles, as Americans had already bought 40,000 to 50,000 bales of wool, most of it in the fortnight ending Feb. 4.

TEXTILE ALLIANCE SOLVES PROBLEM

At this time there was injected into the complicated and perplexing situation an entirely new factor. This was the Textile Alliance, an organization formed some time previously through the co-operation of several of the big associations of manufacturers primarily for the purpose of fighting alleged graft in dyestuff business. Later its activities were enlarged to include the prevention of the undervaluation of imports, and, after the war begun, the securing of an adequate supply of dyestuffs for American mills. Negotiations for the control of imports of Colonial wools were conducted by Sir Richard Crawford, the British commercial agent, and A. M. Patterson, president of the Textile Alliance, and the arrangements were completed before it was generally known in the trade that they were even being considered.

At first, there was much opposition, especially from manufacturers and dealers whose arrangements, financial and otherwise, for the importation of Colonial wools had been completed previous to the announcement of the new plan. After a conference between the protesting manufacturers and dealers and Sir Richard Crawford, most of this opposition died out.

ONLY SOURCES OF CROSSBRED WOOLS

Lifting the embargo from merino wools alone had left the crossbred situation still difficult and unsatisfactory. It was early made plain to American importers that there was no possibility of any crossbreds being allowed to come to this country. England needed them all at home for army purposes. Therefore American buyers were thrown back on South America as the sole outside source of supply of such wools. Buying began there in the latter part of 1914 and extended over into the first two months of 1915. In fact, by the middle of February the bulk of the South American crossbred clip was out of first hands, and thereafter the bulk of sales in both Buenos Aires and Montevideo was wool bought by Germans for speculative purposes. Purchases for the United States in these two markets for the season of 1914-15 were estimated at 75,000 bales, and this total was swelled later by purchases of German-held wool.

Scarcity of foreign crossbreds, and the uncertainties of embargo conditions, enhanced by the speculation in pulled wools, naturally had a stimulating effect on the market for domestic American wools. This led early in February to considerable contracting at various points in the West, beginning with actual purchases in Arizona, where average clips brought 22 to 24c., and one choice clip going as high as 27½c. At other points there was considerable contracting about that time, mainly of clips running largely to medium wool. Such wools were contracted as freely as prevailing offers would permit in Montana, Eastern Idaho and Northern Utah. Prices paid were 23 to 25c. for medium and 20 to 22c. for fine. In the Triangle 25c. was paid for medium clips and 22 to 23c. for fine, where the previous year the market opened at 14 to 16c., and later went to 16½ to 18½c.

Montana medium clips were secured at this time at 24 to 26c., with an occasional choice clip as high as 26 to 26½c. This compared with 17 to 19c. paid in Montana in March, 1914, but only partially indicates the astonishing advance established under the operation of free wool. Conditions were ripe in the East for a strong upward movement, and the comparatively high prices at which early contracts were placed reflected these conditions. The speculative movement in January and early February led to the cleaning up of large accumulations of domestic wools, noted as unsold in the Boston market at the beginning of the year. At that time over 26,380,000 pounds domestic wool were reported on hand, but by the end of February the available amount had fallen to 1,500,000 pounds, according to reliable estimates.

DOMESTIC WOOLS AT HIGH PRICES

Foreign wools were in low supply owing to the working of the various embargoes. Except for the heavy arrivals from South America, manufacturers would have been in something of a predicament. Even that source was insufficient to supply the great weight of medium wool needed by American mills, and dealers were encouraged to go into the West and pay the highest prices on record for domestic wools. Money was easy in the East, stocks of wool were small, and the houses identified with the control and handling of the Territory wool clip had an ample amount of free capital.

Notwithstanding the high prices already paid, due to the competition of mill buyers with the regular wool houses, growers were far from satisfied. While good medium clips were being contracted at 25c., other clips were held at 28 to 30c., and lower bids were rejected. The decline in the speculative fever in pulled wools had no appreciable effect in modifying the buying demand in the West. Pulled wools served their purpose in filling army contracts, but now the problem was a wider and much more important one. There was a shortage of crossbred wools the world over, and if the demands of the domestic market were to be met, additional supplies must be provided to make up for the exclusion of American buyers from the markets of New Zealand.

Most of the early purchases and contracts in the West were made at figures that meant a clean cost landed here of about 63 to 65c. Nevada wools bought by a mill buyer at 19 to 20c. for fine and fine medium would figure just about the above clean cost, wools from the same section selling the previous year at 12 to 13½c., or 50 to 52c. clean cost laid down in the East. After the first flurry of contracting was over there was a lull in buying, and some recession of values, judging by the bids made by Eastern buyers at that time. This was due to the gradual improvement in the foreign situation under the operations of the Textile Alliance and the arrival from Australia, Cape Colony and South America of a big volume of new clip wools. Arrivals of foreign wool at Boston for the first three months of 1915 were over 57,000,000 pounds, or about 1,000,000 pounds more than in the same period of 1914, when the trade was not working under war conditions and there were no embargoes to interfere with importations.

One of the striking features of the year was the large volume of Cape wools absorbed in this market. Estimates of purchases of 20,000 to 30,000 bales of fine Capes to come to this country were freely made, and it is thought that these were conservative figures, and that the volume was greatly swelled by later purchases. These wools were seldom imported under the high tariff regime, but free wool and the removal of the embargo made them available. Snow white Capes have also been handled freely, the general prices ruling being 65 to 67c. for combing Capes and 57 to 60c. for snow white wools, according to shrinkage.

BUYING OF NEW DOMESTIC CLIP WAS SLOW

Operations of the buyer for a leading mill concern, who was a sharp competitor in the West with the buyers for the leading wool houses, caused no little comment. Large blocks of wool were secured in Washington and Oregon on the basis of 24 to 26c. for medium clips and 19 to 20c. for fine. These and later purchases were estimated to show a clean cost of 63 to 65c., which at the time was thought to be altogether too high, though later events made it look really low. In Nevada,

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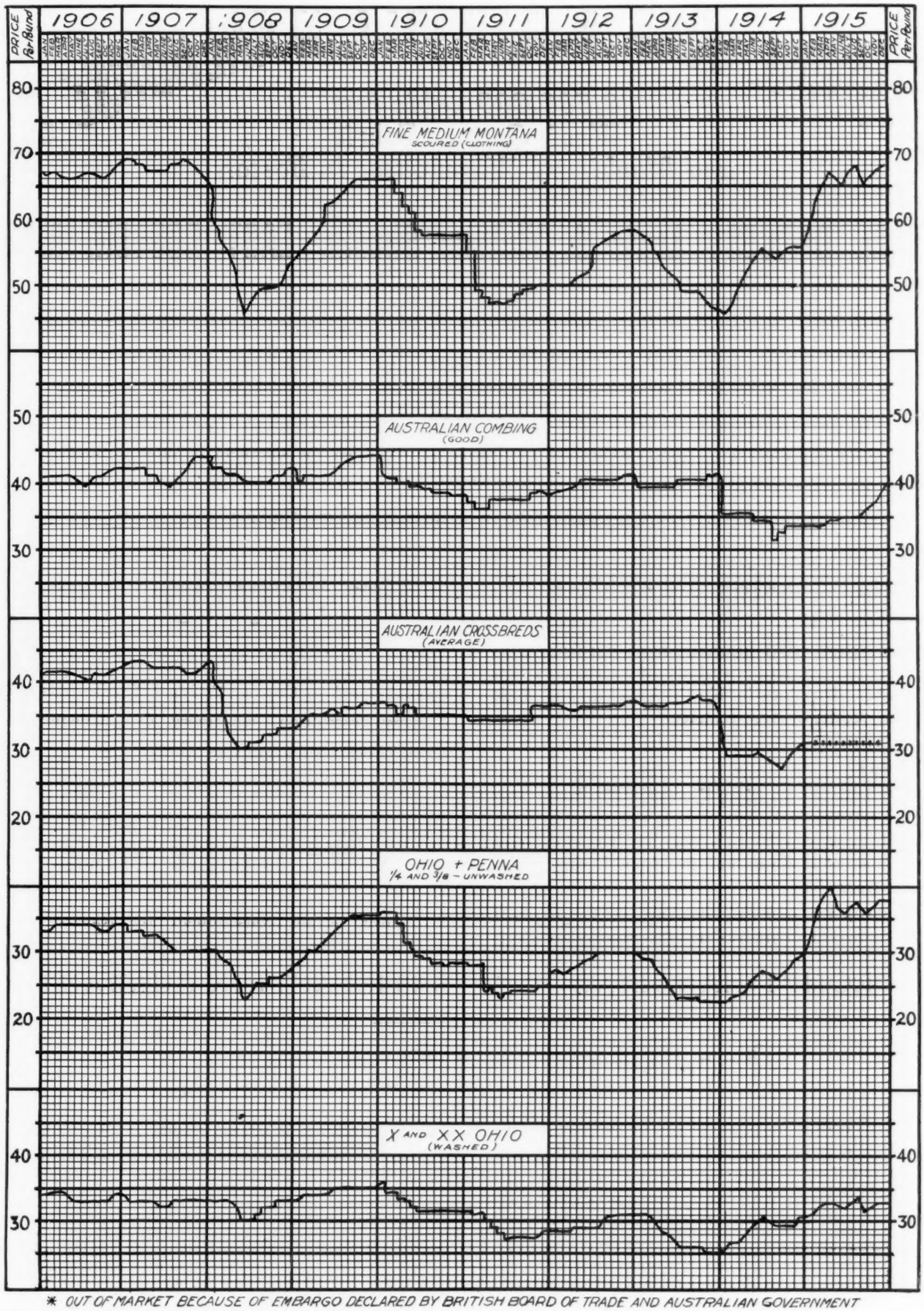
WOOL

116-122 Federal Street - - - - - Boston, Mass.

WOOL PRICES FROM 1906 TO 1915, INCLUSIVE

COMPILED BY THE TEXTILE WORLD JOURNAL FROM REPORTS OF ACTUAL SALES MADE IN THE BOSTON MARKET



* OUT OF MARKET BECAUSE OF EMBARGO DECLARED BY BRITISH BOARD OF TRADE AND AUSTRALIAN GOVERNMENT

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Enable us to quote LOW insurance rates, our equipment is complete in every detail, we have direct railroad connections with all points in North America, and dock facilities for vessels of large tonnage.

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in Transit or on consignment by Rail or Water.

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There is no phase of the business of receiving, handling, checking, weighing, resorting, warehousing and forwarding merchandise with which we are not familiar. An experience of many years as Public Warehousemen makes it possible for us to assure our clients that they will receive prompt, intelligent and satisfactory service in every detail.

For years we have carried the accounts of many of the largest shippers in this country.

WE WILL GLADLY GIVE ESTIMATES

the same and other interests paid 19 to 20c. for fine and fine medium clips, estimated 63 to 65c. laid down here, where the previous year wools in the same section sold at 12 to 13½c., mainly the latter figure, and were estimated to cost 50 to 52c. laid down in Boston. Total purchases for the season by the mill referred to above were estimated at 10,000,000 to 12,000,000 pounds, its competition being a serious matter, and, it was claimed, unreasonably boosting prices.

In spite of adverse conditions in the East, dealers began to nibble again, and by the end of April another buying movement was under way. At that time buyers for Eastern houses secured 2,500,000 to 3,000,000 pounds in Utah alone, paying 22 to 24c. for ordinary clips and 27 to 28c. for choice medium clips. Scoured values of these purchases were variously estimated at 57 to 60c. In other States, buying was going on slowly, the leading mill interest referred to above picking up considerable wool at top prices. In Nevada, 18 to 20c. was being paid, or 67 to 68c. clean, and in Washington and Oregon, early values were still noted. In Western Idaho, small clips changed hands at 23 to 25c. in the grease or 65 to 67c. clean.

A little later, at Rexburg in the Soda Springs district, as high as 27½c. was paid for a lot of about 1,000,000 pounds of association wool, and other neighboring clips were taken by the same house at 25c. Mill buyers took in about 700,000 pounds of wool in Wyoming at 25 to 25½c. On May 18 all bids were refused at a public sale at Mountain Home, western Idaho, though the prices offered showed a clean cost of 55 to 65c. Buyers had similar experiences at Rawlins, Wyoming, and Echo, Oregon. Late in May, some of the best medium clips around Dillon, Montana, were sold to eastern buyers at 27 to 28c., prices at various other points in that State ranging from 25 to 27c. Similar conditions existed in the Triangle, where ruling quotations at the end of May were 26 to 27c.

SPASMODIC BUYING AND ITS CAUSE

The fleece wool situation was developing slowly, but was exceedingly strong. Late in April, local buyers were reported to be paying 25c. for fine and 30c. for medium, with bids of 22 to 27c. from Eastern buyers being turned down. Even at this time, some growers were demanding 30c. for unwashed wool, both fine and medium. Michigan growers were realizing 29 to 30c. for medium clips at this time, and in both Ohio and Michigan, the farmers were showing much independence. Here, as in the territory wool sections, buyers were constantly obliged to raise their buying limits, but were getting little wool. Some buyers felt constrained to withdraw temporarily from the market, only to come in again on a higher level. Throughout the season the advantage was entirely with the grower. Two things contributed to this fact. Heavy purchases of foreign wool, due to arrive at an early date, made it an important matter to maintain a stable market in the East. Apparently an easy way to do this was to buy moderately at the high prices prevailing in the West, for the sake of the sentimental effect on distributing markets. Another reason was the necessity for using a certain proportion of the stronger domestic fleeces to make a satisfactory blend for mill use. This has always been the strong point about Ohio fleeces, and naturally it came sharply to the front in view of the tremendous importations of Australian and Cape fine merinos.

In May and June there was another wave of buying excitement in the Territory wool section, with 21 to 24c. being paid in Wyoming, 26 to 28c. in Montana and 26 to 27c. in the Triangle. Medium wools principally were wanted, and any clips below fine medium were readily taken when the growers were willing to accept current bids. Public sales in Idaho and eastern Oregon were disappointing to both buyers and growers, to the former because their highest bids were turned down, and to the latter because they were not able to get their full asking prices. At Mountain Home 17 to 18c. was paid for fine and 25 to 26c. for medium. At other points, fine clips were selling at 17 to 19c. and medium at 26 to 28c. Scoured values were conservatively estimated at 62 to 65c. for fine and fine medium.

HIGH BRADFORD PRICES FOR TOPS

One of the peculiar developments in June and July was the tremendous firmness of the Bradford top market. Australian 64s tops were quoted at 42d. late in June, up to that time a record price. This was surpassed later, however, 64s tops for spot delivery being quoted at 46d., while futures, in some cases for deliveries as far ahead as March, 1916, were quoted at 44d. This caused something of a flurry in the Boston market, and for a time the possibility of the export of tops to England excited much attention. Purchases were made at around 80c., and some tops were actually sent over. Arrangements were made through the Textile Alliance, whereby American topmakers could be relieved of their obligation not to reexport their Australian wools and ship tops to England without danger of seizure. It was reported that Bradford did not take kindly to the idea of importing tops from America, and, before the business had made more than a beginning, prices sagged in Bradford to such an extent that it was no longer possible to continue profitably.

HIGH FOREIGN PRICES HELPED DOMESTICS

July opened with firm and excited markets everywhere. At home and abroad exceedingly high prices were being paid for all desirable wools. Foreign wools still dominated the market, the arrivals from abroad for the half year being more than double the domestic receipts. This was also apparent from the weekly reports on the state of the market, which showed that both buyers and sellers were giving most of their attention to imported lots. At this time, good shafty 70s Australians were quoted at 75 to 78c., with short clothing 70s at 70c., good shafty combing 64s at 68 to 72c. and short 64s at 64 to 68c. Best Cape combing wools were quoted at 68 to 70c., and short fine clothing wools at 60 to 62c.

Owing to the great strength of all foreign markets, including London, eastern buyers had been forced to raise their buying limits in Ohio as well as the Far West. In the Triangle 27 to 28c. was being paid, and in Montana 28 to 30c. These prices were for medium wools, fine clips ranging from 18 to 20c. in Oregon to 24 to 25c. in Montana and the Triangle. These extreme prices held through the balance of the season in the country. In spite of the fact that primary markets were above the parity of Boston, western wool growers were dissatisfied. As a result of this feeling more wool was shipped on consignment to the National Wool and Warehouse Co. than in any previous year in its history. By the middle of August the territory wool States were well cleaned up, with the buyers coming home and the center of interest being transferred to the East.

With the cleaning up of the primary markets in the territory wool States interest was promptly transferred to the East, where manufacturers began to show interest in the new medium wools as soon as it was considered safe to do so. In July and August much territory wool was transferred in the original bags, mainly of clips running to medium. There was also a moderate amount of trading in graded medium territories, the grades most in demand being half blood and three-eighths blood. Scoured values in these first transactions ran at about 65c. for Utah and Wyoming, and a little later at 63, 65 and 67c. for Utah, with fine Utah, Wyoming and Colorado at 68 to 70c. and medium at 65 to 67c. Early arrivals were the early shorn wools, and Montana and Idaho clips were not available until later. Opening sales of Montana were made on the clean basis of 70 to 72c., and of Idaho at 68 to 70c., in both cases mainly of clips running to medium. Fine wools opened slowly, and the bulk of the sale of territory wool made in this market in the late summer and early fall were of medium character.

The tremendous volume of foreign wool already imported and in sight, led to an exceedingly quiet tone to the market for fine territories until late in the year. A softening of values resulted late in September, and for a time there was some eagerness to sell on the part of the weak-kneed. With the cleaning up of the soft spots, however, there was a prompt rally, and in December the strongest market of year was seen, with good sales of fine and fine medium wools.

TEXAS WOOL MOVED FAIRLY EARLY

In spite of wide differences of opinion between buyers and sellers as to the value of the new clip wools, the Texas field was cleaned up fairly early, though some accumulation was noted at Kerrville after the wools at other points were sold. Going prices in the country were 17 to 20c. for eight-months' and 20 to 25c. for twelve-months'. These prices compared with 15 to 18c. for eight-months' and 17 to 20c. for twelve-months' the previous year. Early sales to arrive were made in this market at 63 to 65c. for eight-months' and 68 to 70c. for twelve-months'. Later prices dropped to 58 to 62c. and 67 to 68c., respectively. Fall wools opened at 19 to 20c. in the country, early sales here being made on the clean basis of 52 to 53c.

So much encouragement was found in the local position of fine wools, that the first half of November saw a movement on the part of Boston buyers to clean up the remaining fine wools in Ohio. Buyers from this market picked up several million pounds, the buying starting aroung 27c., or a little less, to the farmers, and quickly advancing to 28½ and 29c., and it was finally reported that as high as 30c. was paid to farmers in the heighth of the excitement.

LARGE BUYING IN NEW ZEALAND

Prominent among the leading events of the last half of the wool year was the lifting of the embargo on the shipment of New Zealand crossbreds to this country. The strong position of crossbreds had already been shown by the speculative excitement in the Buenos Aires market, and the fact that much of the best wool throughout Argentina had been covered by early contracts at what later proved to be low prices. As soon as there seemed to be a reasonable certainty that Americans would be permitted to buy wool in New Zealand there was a rush to contract clips on the sheep's back, and by the time of the first public sale, which was held at Christchurch, Nov. 11, it was estimated that American buyers had already secured 45,000 to 50,000 bales.

Agitation for the lifting of the embargo from crossbred wools began late in August, and at that time a circular was issued by the Textile Alliance advising its clients to put themselves in a position to take advantage of the shifting conditions. In view of later developments, it is interesting to note that at that time, "the London selling brokers, replying to a Board of Trade inquiry, as to the amount of crossbreds, if any, available for export, stated that 50,000 bales could be allowed to go to America and the Allies, after considering Great Britain's own needs." Acting on these suggestions American buyers began immediately to operate in London.

Americans bought more or less crossbred wool in London in September, and promptly filed applications for permits to ship the same. It was announced in London late in September that the British War Department was prepared to grant licenses for the shipment of crossbred wools, and about the same time Australia announced that "shipments of crossbreds direct to the United States would be allowed, subject to the restrictions and limitations already applicable to merino wools." Definite announcement of its policy regarding the shipment of crossbreds to the United States was not made until after the middle of October, but at that time it was stated officially that "New Zealand will allow exports of a limited quantity of crossbred wools" to the United States, "under the control of the Textile Alliance, and according to the restrictions hitherto in force for the exportation of merino wools from Australia."

"OFF IT GOES; ON IT GOES: EMBARGOES"

Thus the matter rested until the sale at Wellington on Nov. 17, when something approaching a panic was caused among importers in this market by a cabled statement from New Zealand to the effect that the Minister of Customs would allow the exportation of only about a normal volume of crossbred wools to this country, which he figured would be 35,000 bales. As Americans already had under contract or had bought outright well up to 75,000 bales, it was not surprising that there was an immediate and indignant protest from buyers and principals. Little satisfaction was gained from interviews, but as further buying was allowed at later sales, some sort of an assurance regarding the shipment of purchases was supposed to have been obtained.

A TRYING BUT PROFITABLE YEAR

Thus briefly sketched are the salient features of a most unusual wool year. What with decreasing production the world over, the poor quality of wool resulting from drought conditions over a large part of Australia, Panama Canal slides which have interfered with the free transportation of wool from the Antipodes to this market by that route, embargoes off and on, and a constant enhancement of values in all primary markets, the business of importing wool has gone forward under conditions of unusual uncertainty and difficulty. When to these items is added the high level on which the domestic clip was bought in Ohio and the Far West, it will be seen that the lot of the wool man and manufacturer has been by no means easy. It is a matter of common report, nevertheless, in business circles that the wool trade is one of the few lines in which the profits of the year have been above normal. The year closes with all wool values, foreign and domestic, at the highest level of recent years, yet there is an exceedingly optimistic feeling along the Street, and the trade starts 1916 full of courage.

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Pulled Wools

Standard-Uniform-Dependable

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Original and Graded
All Wools Sold on Eastern Terms

Mill Delivery, No Freight or Drayage

English Wool and Textiles in 1915

Year of Unparalleled Boom Throughout Entire Trade With High Prices

(From Our Regular Correspondent.)

BRADFORD, ENG., Dec. 23.

EVERY year brings its exceptional experiences and circumstances, and the year 1915 will stand out prominently as the one during which the greatest war of history was fought. Every incident and every influence, from the smallest to the greatest, has its central point and cause in this great upheaval, and it is impossible to discuss any phase of the wool textile trade without making a more or less direct reference to it. New demands have been created of which no one ever before thought. Countries outside of Great Britain have also had new possibilities brought before them in the way of manipulation, manufacture and sale of woolen fabrics. This has contributed a large share to the increased business referred to. In addition to this, there has been development in the opening out of new business channels, as represented in the erection of new buildings for the storage of wool in port, and the development of ports which were not regarded as being of any importance for the storage and transit of wool before the war commenced. These facts are significant in the light of the tremendous wastage which always goes on during any war. The magnitude of that waste is in proportion to the number of countries involved, the number of men brought into the field, and the area over which the fighting operations extend. At the present time almost every country that can possibly do so is entangled in this great upheaval, and there seems to be—and rightly so—a complete abandonment of all previous recognized racial distinctions. Even countries not actually embroiled in the hostilities are participating in the war in a commercial sense. All this means not only a tremendous amount of financial expenditure, but also the absolute throwing away of large assets in finance and human life. In the midst of it the woolen and other textile trades of the British Empire may be said, taken on the whole, to be more prosperous, and more business is actually being put through than was the case 12 months ago. There may have been a certain amount of shifting about, in the sense that all sections of the industry from grower to manufacturer have not been simultaneously benefited, but putting aside all sentiment, the total benefit to the wool trade has been enormous.

NEW CONDITIONS IN RAW MATERIAL

In a comprehensive review of the wool trade, one must start by dealing with the raw material, for without this the trade would be helpless, and prices paid for wool, whatever the general existent circumstances may be, are always an excellent indication of immediate manufacturing conditions, and also of the ideas held by the members of the trade as to the prospects before them. The most important fact to note in this connection is that the quantity of wool consumed in Great Britain during the last 12 months is greater than ever known before, all records being broken. A greater quantity of wool has been imported from producing areas, and less has been sent out to countries which have been in the habit of buying from us. These increased imports and decreased exports have been coincidental with advancing prices, and at the moment though tremendous quantities of raw material have been consumed or are now in process of consumption, and though further large weights have recently been purchased and will ultimately come forward into the manufacturing areas of Great Britain, yet such remarkable prices have been paid that a casual observer would be disposed to say that there can be no limit to the upward trend of values. At the time of writing the strongest influence upon the price of the raw material seems to be that exercised by anticipatory influences. When a war has been going on for over 18 months, with such carnage and loss as is accompanying the present one, and when the depletion of labor is ever before the eyes of employers, every right-minded man begins to wonder how soon it will all be ended, and though there is no safety whatever in making either suggestions or anticipations with respect to the conclusion of hostilities, enterprising men are looking forward to the time when larger civilian requirements will be found in the market than are existent at the present moment. This attitude is being largely met with by one or two outside countries, buyers from the United States being known to be responsible for some of the high prices which have recently been paid in Australia. A significant fact in relation to wool prices to-day is that they have advanced to their present point in spite of the dolorous feeling to which expressions were given soon after the war commenced. Then there seemed to be no prospect whatever of anything but declining prices, the result of curtailed consumption, but to-day the position of the raw material is an exceedingly strong one. Drought in the Colonies has wrought great havoc among the flocks, large numbers of sheep died through lack of food and water in the early part of the year, and a decrease in the next Australian clip is estimated at about 500,000 bales. Taking this in conjunction with the large manufacturing requirements which are likely ultimately to develop, there is every reason for repeating the statement just made that the raw material is in an exceedingly sound position.

RECORD TIME FOR ENGLISH FLEECES

Seeing that America has always been a good customer in the English wool market, and seeing also that English-grown wools have always been greatly influenced by every important war which has taken place in the history of this country, some important particulars may be set forth under this head. Readers will remember the war between the Northern and Southern States of America, and it is interesting to note that after that war was over, and also after the Franco-Prussian war of 1870, there was a great boom in British manufacturing circles from which English wools benefited considerably. Only in 1864 the price paid for Lincoln hogs was as high as 26d, while at the end they made 32d. In 1872 Lincoln hogs made up to 29d in January, and had only fallen to 28d in December. These record prices have not been reached during the course of the present hostilities, but the majority of English wools are 5d to 6d per pound, more money to-day than they were immediately before the war commenced. The month of September, 1914, may be taken as the one during which everybody was in the dumps and prices for raw material and its products were all at the lowest point. During that month Lincoln hogs were selling at 12½d per pound, Irish hogs were at 14d, while halfbreds were mostly around 13½d, and Down wools ranged from 14 to 16d. The only classes which have

Prices for English Fleece Wool in 1915

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Lincoln hogs	13½	15½	17½	18	17	17½	18½	18	17½	17½	18½	19¼
Lincoln wethers	14	15½	17½	18	17	18	18½	18	17½	17½	18½	19¼
Nottingham hogs	13½	15½	17½	18	17	18	18½	18	17½	17½	18½	19¼
Nottingham wethers	13¾	15½	17½	18	17	18	18½	18	17½	17½	18½	19¼
Leicester hogs	13¾	15½	17*	18	17	18	18½	18	17¾	17¾	18½	19¼
Leicester wethers	14	15¾	17½	18	17	18	18½	18	17¾	17¾	18½	19¼
Yorkshire hogs	14	15½	17½	18	17	18	18½	18	17¾	17¾	18½	19¼
Yorkshire wethers	14	15¾	17½	18	17	18	18½	18	17¾	17¾	18½	19¼
North hogs	16½	18	19	19½	19	19½	21	21	21	21	21½	22½
North wethers	16½	17¾	18½	19	19	19	20	20	20	20	20½	22
Irish hogs, super	16¼	17½	18½	19½	18½	20	21	21	20½	20	21	22
Irish wethers, super.	16	17½	18½	13½	18½	20	20	20	19¼	19	20½	22
Irish hogs, selected.	15*	17	17½	18½	17½	19½	20	20	19¼	19	20½	22
Irish wethers, sel'td.	15½	16½	17½	18½	17½	19½	20	20	19¼	19	20½	21½
Kent tegs, selected	17	18	19	20½	19½	19½	21	21	20½	20½	21	22
Kent wethers, sel'td.	16	17	18½	19¾	19	19½	20½	20¼	20	20	20½	22
Super Stafford hogs.	16½	17½	18½	19	18½	19	20½	20½	20¼	20½	21	22
Super Staf'd wethers.	16	17	18¼	19	18½	19	20½	20½	20½	20½	21	22
Half-bred hogs, Midland Counties	16	17	18½	19	18½	19½	21	21	21	20½	20½	21½
Half-bred wethers, Midland Counties	16	17	18½	19	18½	19½	21	21	21	20½	20½	21½
Norfolk half-bred hogs	16½	17½	19	19½	18½	19½	21½	21½	21½	21	21½	22
Norfolk half-bred wethers	16½	17½	19	19½	18½	19½	21½	21½	21½	21	21½	22
Pick Shropshire hogs.	18½	19½	20½	21½	20½	21	22½	22	21½	21½	22	22½
Pick Shropshire wethers	18¼	19½	20½	21½	20½	21	22½	22	21½	21½	22	22½
Southdown tegs	18½	19	20	21½	21	21½	23	23	23	23	23½	23½
Southdown ewes	18½	19	20	21½	21	21½	23	23	23	23	23½	23½
Cheviot hogs, super.	18½	19	20	29	19	19	20	20	20	20	20½	21½
Best Scotch cross hogs	13½	14½	15	15	14¼	15½	16½	16½	16½	16½	17	17½
Best Scotch cross wethers	13	13¾	14½	14½	14	14¾	16	16	16	16	16½	17
Welsh fleeces, best.	13	13¾	14½	15	14½	14¼	14½	14½	14½	14½	14¾	15½
Radnors, fine	13¾	14½	15	15½	14¾	15	15½	15½	15½	15½	15½	16¾
Radnors, deep	12½	13½	14	14½	14	14	14½	14½	14½	14½	14½	15
Scotch blackfaced	8½	9	10	10¼	10½	10¾	10¾	10¾	10¾	11½	11¾	12
Herdwick ewes and wethers	8½	9½	10	10½	10½	10½	10½	10½	10½	10½	11	11¾

Course of Prices for Tops During 1915

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
90's Colonial tops	29½	31	35	35½	46	49	48	46½	45	44	48	
80's Colonial tops	28	29	33	34½	46	47	46	44½	43	42	45	
70's Colonial tops, av.	26	27½	31	32½	35	42	44	43	40	38	39½	43½
64's Colonial tops, av.	25½	27½	31	32	33	42	43	41½	39	36½	37	42½
60's Colonial tops, sup.	25½	28	30	31	33	40	42	40	38	37	36½	41
60's Colonial tops, ord.	24	27½	29	30	29	40	42	39½	38	36	37½	40
58's Colonial tops, av.	27	28	30	30½	31	35	39	37	34	34	35	39
56's Colonial tops, av.	26	26½	27½	29	30	33	35	33½	32½	32	33	36
50's Colonial tops, av.	25	25½	27½	28	28½	31	32½	30½	28½	27½	29	33
46's Colon. tops, prep.	22½	24	26	27½	28	29	27	26½	25½	26	29½	
46's Colon. tops, c'rdd	22½	24	26	26½	26½	28	28½	26	25½	24½	26½	28½
44's Colon. tops, pick hogs	21	23	26	27	26½	27	27½	26	25	24½	25	28
40's Colon. tops, prep.	20	22	24	26	25	25½	25½	24	23½	23	24	26½
40's Colon. tops, cr'dd.	19	20	22	25	24½	25	25½	24	23½	22¾	23½	25½
36's Colon. tops, prep.	19½	20½	23	24	24	24½	25	23½	23	22	23½	25½
64's Cape tops, sup.	25	27	30	32	34	43	44	41	40½	37½	40	42
60's Buenos Aires, ord.	25	26½	30	31½	31½	40	42	40	38	35	38½	40½
58's pure Southdown tops, extra pick	30	30½	31	31½	32	33	34	35	35¾	35½	36	38½
50's Down tops, pick	25½	26½	27	28	29	31	31½	31	30½	30½	31	32½
46's Down tops, av.	22½	24½	26	26½	27	28	28½	29	28½	28½	29	30½
50's Punta Arena, tops	26	26¾	28½	29	29½	30	31½	30	29	28½	29	33½
46's Punta Arena, tops	22½	23½	26	26½	27½	28½	28	26	25	27	28	28½
46's English tops, pick hog	23½	24½	27	28	28	29	28½	27½	27½	27	29	31
40s English tops, av.	20	22	25	25	25¼	26	26½	25½	24½	24	25½	26½
40's Devon tops	20½	21½	25	25½	25½	27	26½	26	25½	24½	25½	26½
36's Devon tops	19½	21	24	24½	24	25	25	24½	24	22¾	24	25
32's Devon tops	17½	20	22½	23	23	23½	23½	23	22½	22	23	23½
Crossb'd Britch tops.	17¼	19½	23	24	24	24	24	23	22½	21½	21½	23
Scotch 28's gray	12½	13	15	15½	15½	16	16	15½	16	16½	16½	16¾

Course of Yarn Prices During 1915

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1-30's super lustre (40-44's English), per gross	9 9	10 9	12 0	13 0	13 6	13 6	14 0	14 3	14 9	14 9	14 9	15 6
1-30's sup. demi lustre (44-46's Eng. and Col.), per gross	9 9	10 9	12 0	13 0	13 6	13 6	14 0	14 3	14 9	14 0	14 3	15 0
1-30's demi lustre (40-44's English), per gross	9 9	10 9	12 0	13 0	13 6	13 6	14 0	14 3	14 9	14 0	14 3	15 0
1-36's demi lustre (40-44's English), per gross	9 3	10 10	11 6	11 9	12 6	12 9	13 0	13 3	13 3	13 0	13 3	14 0
1-60's ordinary (60's) botany, per gross	7 6½	7 11	9 6	10 6	11 6	12 6	13 6	13 9	13 9	12 9	13 0	13 6
1-60's super (70's) botany, per gross	8 0	8 5	11 0	11 3	12 0	13 6	14 0	14 3	13 9	13 3	13 6	14 0
1-28's alpaca, per gross	12 3	12 3	12 6	13 3	13 3	13 3	14 3	14 3	14 3	13 9	15 0	
1-36's mohair, medium, per gross	13 3	13 3	13 3	13 3	13 3	13 3	13 3	13 3	13 3	13 3	13 3	13 3
2-32's mohair, light, gray, low, per lb	2 5½	2 5½	2 5½	2 5½	2 5½	2 5½	2 5½	2 5½	2 5½	2 5½	2 5½	2 5½
2-32's mohair, light, gray, med., per lb	2 8½	2 8½	2 8½	2 8½	2 8½	2 8½	2 8½	2 8½	2 8½	2 8½	2 8½	2 8½
2-40's mohair, light, gray, med., per lb	3 6½	3 6½	3 6½	3 6½	3 6½	3 6½	3 6½	3 6½	3 6½	3 6½	3 6½	3 6½
2-16's cashmere, medium, scou., per lb	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 0	6 3
2-40's camel hair, scoured, per lb	2 11	3 1	3 2	3 3½	3 3	3 5	3 7	3 7½	3 8½	3 8½	3 10	4 0
1-60's super (64's), botany, per lb	3 4	3 5½	4 0	4 6	4 7	5 4	5 9	5 9	5 9	5 9	5 10½	6 1½
2-48's white (64's), botany, per lb	3 0	3 2	3 9	4 0	4 0	4 6	5 1	5 2	5 0	4 10½	4 10½	5 1½
2-60's white (70's), botany, per lb	3 7	3 7½	4 0	4 6	5 0	6 0	6 6	6 3	6 0	5 11	5 11	6 3
2-48's mixtures and solids (64's), botany, per lb	3 9½	3 10½	4 2	4 6	4 9	5 6	5 9	5 7	5 7	5 7	5 8	5 9
2-48's marls (64's), botany, per lb	3 11	4 0	4 3	4 9	4 10	5 6	5 10	5 9	5 9	5 9	5 10	5 11
2-32's worsted, Scotch, per lb	1 10	1 11	2 2	2 3	2 3	2 4	2 4	2 4	2 4	2 4½	2 4½	2 5
2-32's worsted (40's), crossbred, per lb	2 2	2 4	2 8	2 10	2 10½	2 11½	3 1½	3 2½	3 5	3 0	3 0	3 2
2-40's worsted (46's), crossbred, per lb	2 5	2 7	2 10	3 1	3 1½	3 3	3 5	3 6	3 3	3 4	3 5	3 6
2-40's worsted (46's), English and pick hog, per lb	2 7	2 8	2 11	3 3	3 3½	3 4½	3 7½	3 7½	3 6½	3 6	3 6½	3 8
2-16's worsted (32's), crossbred, per lb	1 11½	2 0½	2 3	2 7	2 7½	2 8½	2 9½	2 8½	2 7	2 6½	2 7½	2 8½
2-16's worsted (40's), crossbred, per lb	2 0½	2 2	2 3	2 8	2 8½	2 10½	2 11	2 10½	2 9	2 7½	2 9½	2 10½
2-20's worsted (50's), crossbred, per lb	2 9	2 10	3 0	3 1	3 2	3 8	3 10	3 10	3 9	3 9	3 10	3 11
3-12's hosiery, white (40's), per lb	2 1	2 2½	2 6	2 7	2 9	2 10½	2 11½	2 10½	2 9	2 7	2 9½	2 10½
3-12's hosiery, white (46's), per lb	2 4	2 5½	2 9	2 11	3 0	3 1	3 0½	3 0	2 10	2 9½	2 10½	2 2½
6's to 12's Genappe, per lb	2 0½	2 3	2 4½	2 6	2 6½	2 8	2 9½	2 10	2 9½	2 8½	2 8	2 8

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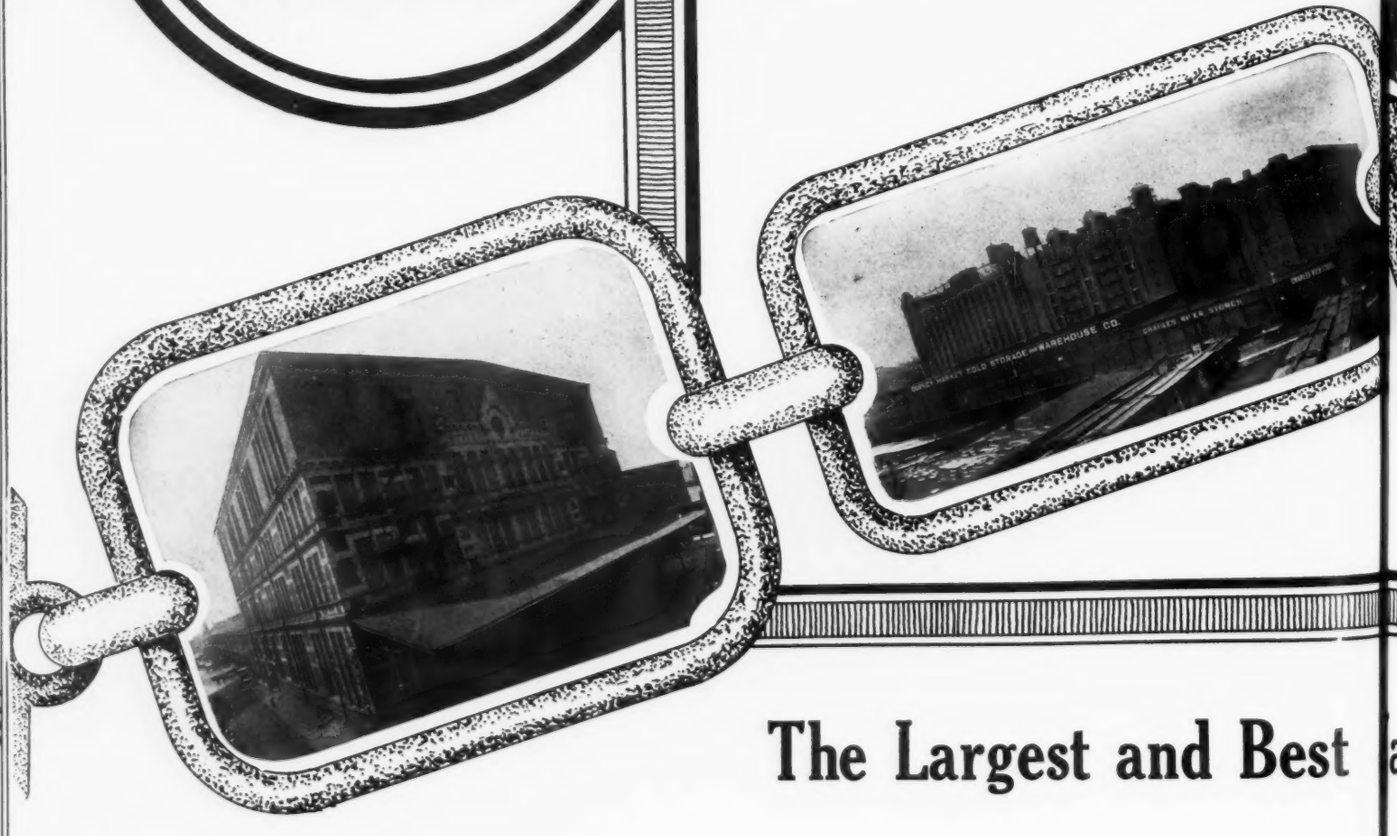

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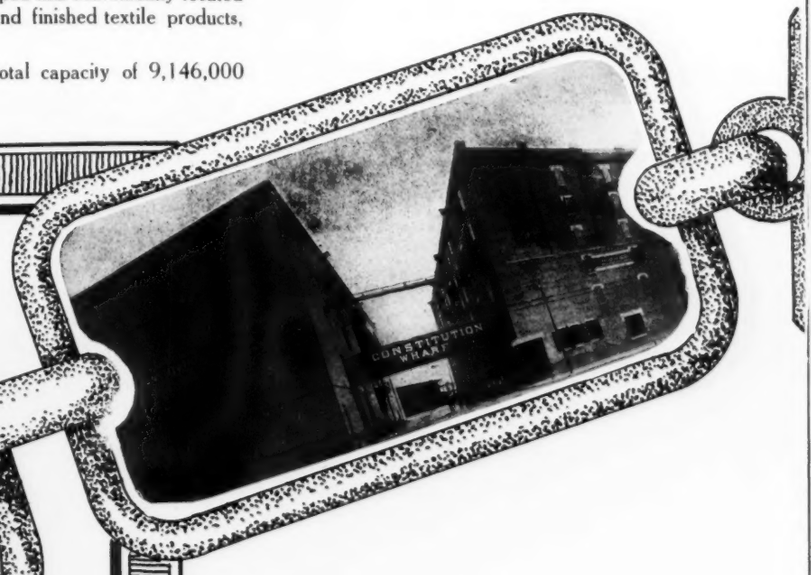

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The date of the declaration of war was Aug. 4, 1914. Before then the majority of the English wool fairs had been held, and that there was not at that time any serious anticipation of the country being thrown into the turmoil which followed. These fairs went exceedingly well, though on later occasions some growers congratulated themselves on not having disposed of their clips, it being a recognized axiom among them that their products were all worth more in war time than during a period of peace. These, of course, are events which took place in 1914, but their significance has been brought out plainly during the past 12 months, and, though an embargo was placed on crossbred wools and a tight hand was held on Scotch Blackfaced, within the course of the last three or four months some members of the trade have been expressing the opinion that the time had come for allowing Scotch Blackfaced to be exported to such countries as could safely receive it, that is, those which could be relied upon not to send wool supplies forward to enemy countries.

WAR BOOSTED WOOL PRICES

The great changes in English wool prices have been brought about by the development of large war requirements. The demands of the British government for khaki cloths supplemented by those for France, Belgium and Russia have all resulted in English wools being in exceedingly good demand, while the large hosiery requirements have contributed their quota to the consumption of Downs, halfbreds and Kents. Every class of wool has moved freely, and, though Scotch was kept decidedly in the background at an early period of the war, the last six month have seen a decided change, and for some time steady demand has been witnessed. There is no need to make extensive reference to the price of Scotch wools, for the comprehensive table here given shows what they are now worth. It is sufficient to say that they are to-day easily 2½d. to 3d. per pound above the bottom point. Stress has been laid upon military orders, and these have undoubtedly influenced prices considerably in an upward direction; but American purchases must receive due credit, and there is no doubt whatever that the buying done by users on that side has contributed the largest share. Merchants in Bradford have frequently stated that they have been quite unable to cope with the inquiry forthcoming, the position in this respect being so acute that firms have been unable to present samples for the simple reason that they were quite cleared out of the lines wanted.

TREMENDOUS DEMAND FOR TOPS

Wool prices are generally accepted as a criterion of the state of the market, but viewing the trade strictly from the West Riding standpoint, it has to be said that prices on tops are a still more reliable indicator of the state of the consuming end of the trade. The outstanding features in the Bradford top market have been the constantly ascending prices for that commodity and the great pressure which has been brought to bear upon combing machinery in consequence of the existence of large immediate demands. When the productive capacity of two important manufacturing countries such as Belgium and France is almost entirely destroyed, and when this state of affairs exists simultaneously with increasing demands for the product which the machinery in those countries would have turned out under normal circumstances, the only thing which one can expect is that the country which can in any measure supply the deficiency, will be called upon to do so. This is exactly what has happened to the combing machinery in this country, and though there is no doubt that efficient organization has done much to prevent absolute chaos, there is still some indication of a need for a further straightening out, and not until the war is ended and more machinery is brought into operation on the Continent will the pressure, which is now being experienced, be relieved. During the past 12 months there have been occasions when the market has been much disturbed by the demand made for early delivery of botany tops, and almost fabulous prices have been paid to secure the delivery wanted. The inability of topmakers and combers in individual cases to fulfill their contracts, has resulted in the market being scoured in order to find any who by chance could supply the need of the moment. This has been the most fruitful cause for top prices having advanced so tremendously, and though at the time of writing a somewhat more normal state of affairs obtains, it is a fact that topmakers are naming prices for delivery three or four months into next year which are decidedly above the average level. From a state of extreme depression the top market has been lifted into one of extreme healthiness and soundness, and the prospect seems to be that even when civilian requirements have to be entrusted with the continuance of trade, good values will continue to be paid. At the present time both botany and crossbred tops are about 24c. per pound more than they were 12 months ago.

GREAT PRESSURE UPON MANUFACTURING

Many influences have been at work upon the wool trade which have been noticeable only to those intimately associated with its workings. The strongest outward evidence of the great healthiness and activity which has existed in manufacturing circles is, however, one which is patent to all. In West Riding and Yorkshire mills have been running at high pressure, this being particularly so during the early stages of the war when the British government stepped in and demanded that all civilian orders should be put on one side, and that military orders be completed. In order to comply with these demands overtime became necessary, the result being that in many mills the machinery was never allowed to stand, two shifts of hands being employed in keeping the machinery running and getting out the manufactured goods. Of course, for some time the fabrics were all of the khaki order, and not until the government was satisfied that there was sufficient khaki to clothe the soldiers was there anything of the nature of a slackening. Even since then looms and spindles have been well occupied, and though there have been occasions when new orders were scarce, it has inevitably happened that before there was any opportuntiy for machinery to come to an actual standstill, further business was placed. In this way the ball has been kept rolling, and though overtime is not now so general as it was, there are many mills which are being kept running much longer than the ordinary working day.

The military demands of France, Belgium, Italy and Russia have all, in turn, contributed to the pressure which has been experienced, and even neutral countries, particularly Scandinavia, have come in and offered orders. With respect to these latter countries, however, the imposition of embargoes has been a serious obstacle, and one wonders what the state of the trade in this country would have been at the present time if orders had been allowed to flow with their wonted freedom. Last August and September was probably the quietest period experienced since hostilities began. All machinery was then certainly well occupied, and there was no immediate prospect of its being brought to a standstill, but orders placed were smaller than those given out during the height of the boom. The supposed placing by Italy or Russia of khaki orders in the United States aroused criticism, particularly as it was stated that there was ample room for them in this country, and that looms were being kept standing for want of work. There seems, however, to have been little real ground for the complaints which were made, recent developments having shown that there was less justification for them than any one supposed, and there has been no slackness anywhere except among a few manufacturers of high-class goods. During November orders totaling 6,000,000 yards of khaki serge were placed among the manufacturers of this country on Russian account, and this means not only a continuance of the good manufacturing conditions, but also that topmakers and spinners have taken a longer lease of life in respect of the orders they have on their books. Prices for both tops and yarns have received impetus from this cause, and, though there is no doubt whatever that the opportunity is being taken as much as possible to supply the civilian requirements, these military orders will certainly have to be handled with sufficient facility to insure delivery on the date required. This means that the position of the manufacturers of this country is an exceedingly healthy one, for, in addition to the booking of these military contracts, there is no abatement whatever in the demand on export account. The Canadian market has recently been showing considerable improvement, while both France and the home trade have been placing orders for gabardines and dress goods.

English Textile Trade in 1915

Extraordinary Year in Colonial Wool With Wide Fluctuations

(*From Our Regular Correspondent*)

LONDON, ENG., Dec. 22.

THE course followed by the Colonial wool trade during the last twelve months has been phonomenal and 1915 is likely to be looked back upon as perhaps the most extraordinary period the staple has ever experienced. Both supply and demand were subject to influences of exceptional character. From the beginning of the year there was continuous difficulty in the transference of bales of wool from the ships in which they arrived to the warehouses in which they were to be exposed. This, in the early months of the year, produced a condition almost chaotic. Experience taught sellers that it was useless to fight against impossibilities and so gradually things settled down to the acceptance of a maximum offering of 8,500 bales per day. It has not always been found possible to maintain even this reduced total, however, and the outcome of the arrangement, together with the ultimate elimination of selling on Mondays, has caused the auctions to be spread over a much larger portion of the year than usual, thus curtailing the opportunities upon which dealers and top makers rely for passing on their purchases to customers. Another adverse influence affecting supplies was the inability of the railway companies to handle the transportation of wool to manufacturing districts, causing great accumulations at the various docks and warehouses, while owners were in urgent need of the wools they had bought and paid for but could not have delivered. Although some improvement has been effected in recent months, there are still many non-delivered and wrong-delivered bales not yet adjusted.

WAR REQUIREMENTS DOMINATE

Demand has to some extent been affected by government action. The embargo on the exportation of merino was removed with respect to certain destinations, followed in the autumn by the removal of the embargo on a specified quantity of crossbred. But the dominating feature in the situation as regards demand has been the military and naval requirements of this country and of those which are in alliance with it. Most operative has, of course, been the requirements for wools of crossbred character, but for more than half the year, the buying of scoured merinos for the woolen factories of Russia has been the deciding influence in establishing the value of these descriptions.

SHARP AND WIDE FLUCTUATIONS

Fluctuations during the course of the year have often been sharp and sudden, likewise wide and varying. The same article has shown a difference of 2d. per pound in price, not only in one week as compared with its successor, but even in the course of but a few days. This indicates another of the difficulties under which business was carried on and demonstrates the awkwardness of the position in which London representatives of growers in the Colonies were at times placed. The clearage between the value of merino wools of good staple and condition, and of those of short and decidedly faulty character has been very striking, and tended to become more and more accentuated as the year progressed. Decided faulty crossbreds also showed, though not to the same extent, a marked disproportion in value, more especially during the months when the coarser fibered article was on the down grade. In the classes of raw material referred to the absence of customary extensive Continental demand was severely felt, and while the home industries would have been glad to take advantage of the much cheaper wool thus available, they were prevented from operating on an extensive scale, through the congested condition of the existing carbonizing plants. So far as it is possible to generalize under the exceptional circumstances at present obtaining, it may be said, that merino wools are 40 per cent., fine crossbreds 30 per cent., medium crossbreds 30 per cent., and coarse 30 per cent. higher than at the close of 1914.

OPENING SALES IRREGULAR

At this time it is a little difficult to visualize, far less account for the position of fine-haired raw material just prior to the opening of business in 1915. At that time the trade was haunted by the apparition of an avalanche of merino wool with which it was feared it would be impossible for the machinery in the British Isles to cope. Removal of the embargo on the export of these descriptions had been insistently and widely urged, and the government at length decided to accede to the request. Before the selling season opened on Jan. 19, it was intimated that, under certain guarantees, the export of merino wools would be allowed to Great Britain's allies, to the United States of America, and to other approved neutral countries. Naturally this arrangement exercised a stimulat-

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ing effect and added to the famine which the impossibility of getting imports to the mills tended to create, causing the first auctions of the year to show a marked contrast to the closing sales of 1914. As the sales progressed the market grew stronger and prices steadily hardened, until at the close an advance was registered of 7½ per cent. in the case of good merino wools, and 15 to 20 per cent. in that of faulty sorts, descriptions which in the previous auctions received slight attention.

U. S. STARTED BUYING

The removal of the embargo on merino wools, having come with some suddenness, found comparatively few American representatives in London, but at the end of the two and a half weeks' interval, which separated the first and second series of sales, United States buyers appeared in force. Before the sales opened a newly devised method to secure wool going across the Atlantic from getting to the enemy was communicated to the trade. If not quite agreeable to American operations, it was generally approved, and purchases were made on so liberal a scale that a further rise in prices naturally ensued. Thus, while greasy and scoured merinos started with a rise of 5 to 7½ per cent., by the time the brief series of ten days was over a further rise of equal proportion had been established. Fine qualities of the greasy crossbred staple did little more than hold their own, but coarse and medium grades appreciated in value to the extent of 5 to 10 per cent., while slipes were only slightly dearer than on the previous occasion. The third series began March 16, coinciding with a time of extreme pressure on all the mills of this country, which did not have machinery enough to cope with the orders for war requirement which poured in upon them from the British government and from France.

CROSSBRED PRICES DECLINE

The Easter season brought a well earned rest to those engaged in the wool trade albeit it cut down the time for clearing up arrears and getting things in order to a bare three weeks. When the trade assembled in London for the fourth series it was found that the demand for crossbreds had depreciated. The decline in prices was not serious; still it marked the turn of the tide and was attributed primarily to a cessation of the home government's orders, and secondly to some financial stringency. Many were still unable to obtain delivery of importations for which they had long since paid, and top makers were unable to get their wools combed, the initial step toward converting them into money. At the outset the finest grades showed little or no change, whereas medium and coarse sorts receded to the extent of 5 to 7½ per cent. As the sales progressed the backward movement in these descriptions increased, but a rally toward the end brought about considerable recovery. Poor conditioned and short slipes were the most seriously affected, suffering a fall of about 10 per cent. Merinos, at least, those of good character, found the strongest market, the most conspicuous features in that connection being a powerful Russian demand for the best scoureds, and extremely spirited competition by the home trade and the French government for shafty warp parcels.

CROSSBREDS UP AND DOWN

The interval which ensued was of five-and-a-half weeks' duration and proved a period of general activity in the home and Continental manufacturing districts. An extensive and varied inquiry for raw material was experienced in London, emanating not only from Yorkshire but also from the French government and on Russian account. This led to a considerable turnover by private treaty which, but for the difficulty experienced in getting new arrivals from ship to warehouse, and transported from London to the interior, would doubtless have attained greater dimensions. Simultaneously, at the country fairs and auctions record prices were being secured for the homegrown clip. Under these circumstances the opening of the fifth series on June 29, took place under the most favorable conditions and with every prospect of their continuance. Greasy merinos immediately exhibited a gain in value of 5 to 7½ per cent., while scoureds were almost equally strong in demand and price. Crossbred descriptions did not do quite so well in so far as fine qualities were concerned. They merely maintained their position, whereas, medium and coarse grades appreciated to the extent of 5 to 7½ per cent. A somewhat staggering surprise, however, awaited the trade; before the series had been eight or ten days in progress, things took an unlooked for turn. In the light of subsequent events there can be little doubt that the cause was mainly financial, though the lack of fresh government orders played a part. The tying up of money in wool, delivery of which could not be made, or which when obtained could not be combed, had been steadily on the increase, and, as a matter of course, exercised a crippling effect in many directions. Except in the case of shafty warp merino in the grease, which ultimately stood as much as 15 per cent. above the final May level, and the choice sorts of scoured which maintained their position, prices sagged all round, the most pronounced decline taking place in the price of medium and coarse greasy crossbreds, which, in addition to losing their initial gain, fell further to the extent of 7½ to 10 per cent. Much the same weakening occurred in slipes which depreciated 10 per cent. from their final May parity.

SHAFTY AND SCOURED MERINOS STRONG

The longest interval of the year followed these sales which ended on July 24, the sixth series opening on Sept. 6. An opportunity was thus afforded for rest and holiday taking, also for attending to arrears which had mounted up in the early months of the year. Little in the way of fresh business was done until nearly the end of August, when America showed some interest in faulty scoured merino wools. The auctions were well attended but the competition was somewhat intermittent. It was consistently strong so far as shafty greasy merinos were concerned, enabling these fully to maintain their position. The demand was likewise always good for high-class scoured merinos, largely appropriated by Russia, but other sorts declined, medium wools losing 5 per cent., and inferior and faulty fully 10 per cent. of their value. Crossbred wools in the grease showed no important alteration. The two extremes of quality ruled slightly dearer, but the grades between were quite unchanged, except in the case of such lots as were taken for export to America.

GENERAL ADVANCE AT SEVENTH SERIES

No development of importance occurred during the three weeks which intervened between the sixth and seventh series and the latter opened much on the level at which the former closed so far as fine-haired wool was concerned. For crossbreds an increased demand at once asserted itself which was effective in raising the value of most descriptions 5 to 7½ per cent. For a time selling of all fair to good sorts went on steadily on this basis, while short faulty and inferior merinos dragged heavily at a decline of 5 to 10 per cent. Within about a week of the close the market suddenly but emphatically braced up with the result that all classes reached a position in advance of that at which they stood when the sales began. Compared with the final September quotations greasy combing merinos ruled 7½ per cent., scoured combing merinos 5 per cent. higher, and even faulty sorts realized from par to 5 per cent. advance. Still more marked was the rise in crossbreds, which made a gain averaging 10 per cent. in the case of the greasy and slipe classes, and of 12½ to 15 per cent. in scoured descriptions.

The short interval prior to the final series was far from being inactive. Considerable demand showed itself immediately after the auctions closed, on export account, chiefly affecting fine crossbred wool, but before the two and a half weeks had run their course demand grew in liveliness and spread to the industry of this country. The main cause of the activity was the receipt of an army contract from Russia with the prospect of further business from that quarter and of extensive orders from the British War Office. Under these circumstances the auctions opened with an excellent tone, and as they progressed strength was added to strength and the closing level was the market's highest. The advance established in values ranged from 5 per cent. in the case of short, faulty, to 15 per cent. in that of shafty warp combing merino, and from 7½ per cent. for slipe crossbred lambs to at least 12½ per cent. for good to superior scoured and greasy. On this basis practically all the wool in warehouse was disposed of, only 10,000 bales remaining unsold to be carried forward into the new year.

Values of Wool for Seven Years

The following are the average values of a bale of Colonial wool in London during the past seven years:

	1915.	1914.	1913.	1912.	1911.	1910.	1909.
Merinos	£18¾	£17	£17¼	£15½	£15½	£17¼	£15¾
Crossbred	24	18½	17½	15½	15¾	17	14½

Statistics of supplies during the past six years and of the total quantities of Colonial and River Plate wool imported from 1896 to 1915 as compiled by H. Schwartze, Buchanan & Co., of London, England, are appended:

Imports of Wool for the Season

	1915.	1914.	1913.	1912.	1911.	1910.
Sydney	525,464	203,256	220,387	227,244	279,772	301,367
Queensland	228,748	147,476	138,346	123,294	153,836	150,292
Port Phillip	302,172	225,551	243,708	326,012	295,381	297,393
Adelaide	86,675	63,662	76,459	99,602	103,538	93,978
Tasmania	21,369	17,618	19,390	20,985	20,557	19,382
West Australia	72,469	57,375	68,184	81,894	70,632	67,796
New Zealand	559,904	508,030	521,104	522,396	510,282	525,737
Total Australasian	1,796,801	1,222,968	1,287,578	1,401,427	1,433,998	1,455,946
Cape	373,418	377,850	358,280	357,126	295,167	313,471
Total into England	2,170,219	1,600,818	1,645,858	1,758,553	1,729,165	1,769,417
Of which was forwarded by Australasia:						
To interior	735,300	460,400	*446,200	*426,400	*460,000	*477,000
To the Continent	16,600	64,100	*64,100	*95,400	*101,200	*138,000
To America	47,600	21,500	*21,200	46,200	*20,000	*79,000
Total	799,500	546,000	*531,500	*568,000	*582,000	*694,000
Cape: To interior	284,700	141,500	128,000	107,700	83,000	73,000
To the Continent	1,300	182,000	182,000	*191,000	152,900	189,400
To America	29,000	1,000	1,000	2,300	1,100	600
Total	315,000	324,500	311,000	301,000	237,000	263,000
Total forwarded	1,114,500	870,500	*842,500	*869,000	819,000	957,000
Continent (direct) Australasian	251,824	1,063,556	1,001,263	1,053,768	1,077,323	933,018
Cape	145,512	120,968	125,966	105,645	80,870	63,265
America (direct) Australasian	108,419	45,974	7,978	8,101	12,591	22,316
Total Australasian	2,157,944	2,332,498	2,295,919	2,463,296	2,523,912	2,411,280
Cape	518,930	498,818	484,246	462,771	376,037	376,736
Total Colonial bales	2,675,974	2,831,316	2,780,165	2,926,267	2,899,949	2,788,016
River Plate sent to Europe	260,000	330,000	407,000	460,000	478,000	425,000
To the United States	118,000	46,000	30,000	37,000	21,000	36,000
Total bales	378,000	406,000	437,000	497,000	499,000	461,000
*After deducting wools sent to London market, Australia sent to America	.....	1,895	1,895	2,247	354	1,349

Comparative Imports Into Europe and North America

BALES.

	Australasian.	Cape.	Total Colonial.	River Plate.	Punta Arenas.	Faulkland Islands.	Total.
1896	1,846,000	288,000	2,134,000	543,000	12,000	7,600	2,697,000
1897	1,834,000	274,000	2,108,000	550,000	16,000	7,600	2,682,000
1898	1,703,000	279,000	1,982,000	555,000	21,000	7,000	2,565,000
1899	1,641,000	267,000	1,908,000	540,000	22,000	8,000	2,478,000
1900	1,456,000	140,000	1,596,000	468,000	22,000	7,000	2,093,000
1901	1,745,000	217,000	1,962,000	532,000	27,500	7,800	2,529,000
1902	1,699,000	234,000	1,933,000	512,000	31,000	8,000	2,484,000
1903	1,451,000	234,000	1,685,000	558,000	36,000	7,000	2,286,000
1904	1,371,000	201,000	1,572,000	476,000	38,000	7,300	2,093,000
1905	1,633,000	209,000	1,842,000	488,000	30,000	1,100	2,367,000
1906	1,833,000	238,000	2,071,000	487,000	33,000	7,200	2,598,000
1907	2,103,000	287,000	2,390,000	478,000	45,400	7,600	2,921,000
1908	2,072,000	276,000	2,348,000	484,000	50,600	7,100	2,890,000
1909	2,296,000	380,000	2,676,000	571,000	52,000	8,100	3,307,000
1910	2,411,000	377,000	2,788,000	461,000	55,000	8,100	3,312,000
1911	2,524,000	376,000	2,900,000	499,000	60,500	8,200	3,468,000
1912	2,463,000	463,000	2,926,000	497,000	53,000	8,000	3,484,000
1913	2,296,000	484,000	2,780,000	437,000	63,000	8,000	3,288,000
1914	2,332,000	499,000	2,831,000	406,000	58,000	8,000	3,303,000
1915	2,157,000	519,000	2,676,000	378,000	45,000	7,200	3,106,000

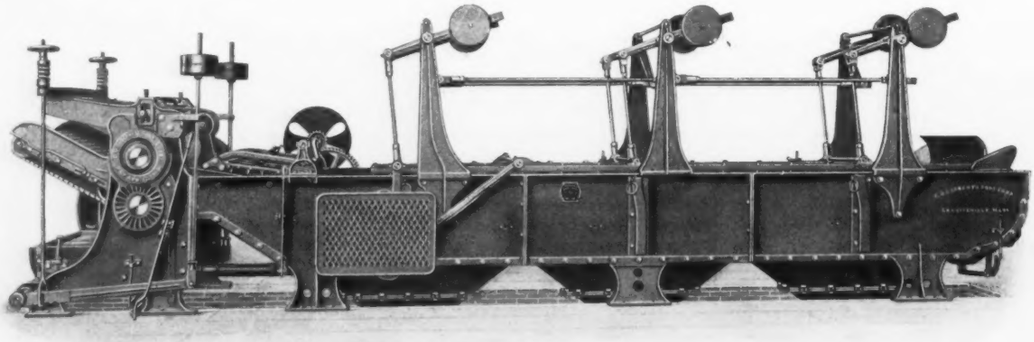
STOCKS OF WOOL IN CHICAGO

The following comparative tables of Chicago wool stocks have been prepared by John H. Howard & Son. This year's estimate is up to Dec. 28.

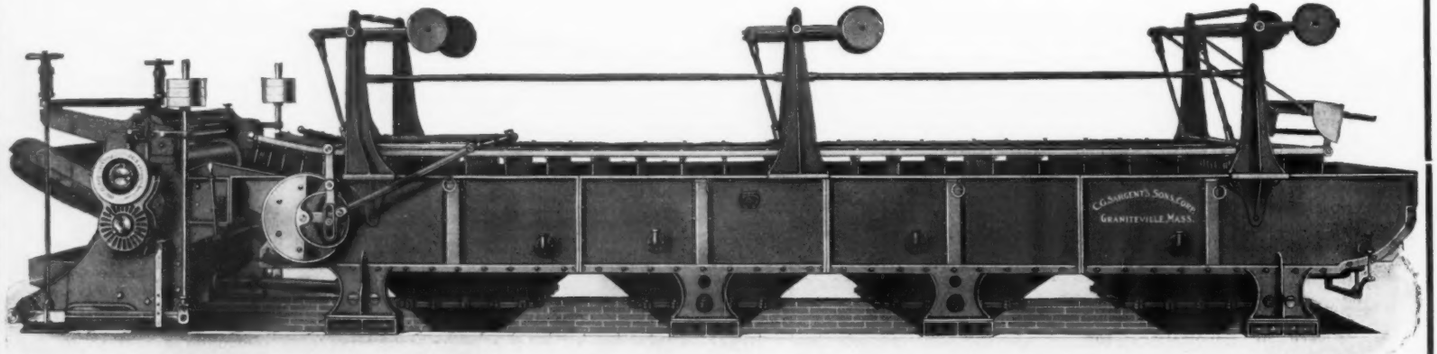
1915.	
Territory	12,610,000
Bright and Semi-Bright	2,350,000
Pulled	1,962,000
Scoured	977,500
Sundries	50,000
	17,949,500
1914.	
Territory	3,590,000
Bright and Semi-Bright	1,705,000
Pulled	2,130,000
Scoured	486,000
Sundries	10,000
	7,921,000
1913.	
Territory	6,485,000
Bright and Semi-Bright	465,000
Pulled	1,483,000
Scoured	723,785
Sundries	140,000
	9,296,785
1912.	
Territory	3,440,000
Bright and Semi-Bright	927,000
Texas	53,000
California	20,000
Pulled	1,418,400
Scoured	820,560
Sundries	38,600

THE SARGENT WOOL WASHER

Embodies ideas making for production and quality of output; economizes in soap, power and physical effort; depreciation reduced to the smallest percentage; as strongly recommended by the man in overalls as by agent, superintendent or proprietor.



Interior of Bowls positively self-cleaning **at the same time that liquor is drawn off** —Result, time saved = capacity gained. Liquor drawn off or transferred to preceding Bowl rapidly,—Result, time saved = capacity gained. Large volume Settling Tank. Large volume Scouring Bowl,—Results, long run with same liquor = capacity gained.



Meritorious points from feed to doffer end. A highly representative American Wool Washer made in the United States of America for home production and for export.

Oversea inquiries of our Wool Washer, Wool Dryer, Burr Picker or other machines which we build will be promptly answered, with particulars and prices.

Les demandes d'informations d'outremer sur nos Laveuses de laine, Sécheuses de laine, Arracheuses d'épines et autres machines que nous fabriquons, recevront une prompte réponse avec détails et prix, dans la langue d'origine.

Las solicitudes de allende el mar relativas a nuestras Lavadoras de lana, Secadoras de lana, Arrancadoras de espinas y otras máquinas que fabricamos, recibirán pronta atención, con detalles y precios, en la lengua de su origen.

C. G. Sargent's Sons Corporation

Graniteville **Massachusetts, U. S. A.**

AUSTRALIAN SYSTEM

(*Continued from page* 53)

years accustomed to buying wool only in the original bag. He can make a fairly good guess at the shrinkage in a locality he has visited many seasons, but when it comes to estimating the shrinkage upon any given class of skirted wool he appears to be absolutely at sea. Nor does he appear to be able to determine the comparative value of the skirted fleeces, of the bellies, and of the skirts. But is this the fault of the system? We made no more classes than are made in Australia with the same kind of fleeces, and if the system itself is faulty why do not these buyers suggest to the Australian sheepmen that they make fewer classes, particularly for the American trade? In short, is it

WHEN THE SHEEP ARE SHEARED, SHOWING SHEARERS' STATIONS

not because of lack of experience or knowledge that the number of classes we made proved confusing? To us it is inconceivable that the wool has been injured because of the different qualities being segregated as Australians segregate them. As to expense at the shearing shed, the number of classes makes no difference. There are a number of manufacturers in this country who appear to be able to use all grades of western wool and who send their representatives West to buy it in the original bags. There also appears to be a considerable number of American manufacturers who will buy little or no wool in the original bags because it is unsuited to their needs. Now, if we continue to pack it in the old way the market for our wool is more restricted and it does not require profound reasoning to reach the conclusion that the manufacturer who can use the wool packed in the old way must be able to buy it at a lower price than if the values were properly segregated.

Wool classed and baled takes a 15 per cent. lower freight rate from Intermountain points than when packed in the old way. In many localities this means a saving of more than 2c. per fleece.

The expense of twine and the labor of both tying the fleeces and afterwards removing the twine are eliminated.

The actual placing of the wool in the bales at the Pioneer sheds, after it left the hands of the classer, the past season was faulty. The fleeces were in many instances broken and many errors were made by the handlers. This was due to our having only an amateur baling crew. It comes as a result of the fact that employes in the West have never been taught that a fleece of wool is valuable. There is no good reason why a fleece after being properly rolled and classed cannot be so packed in the bale that when the package is opened the fleece will be found intact. In another year or two this will be accomplished without difficulty, and we will hear no suggestions that the fleeces should be tied.

CREDIT TO MANUFACTURERS

It may be interesting to manufacturers to know that it was three or four of their number who unknowingly brought about the introduction of the Australian system. A few years ago C. H. Harding came to the West and addressed gatherings of sheepmen. He explained clearly and concisely various methods of handling wool. His words were from such an unselfish standpoint that they awakened in the mind of every sheepman who heard him a desire to know more about wool. Probably Mr. Harding will never know the part he took in the establishment of the first Australian shearing shed in this country, but the owners are grateful to him for his visit to the West. If they have made a mistake in establishing these sheds and classing their wool he can confer a favor upon them as well as upon the sheepmen by telling them frankly that they are wrong and should discontinue.

Some five years ago a Wyoming sheepman, in company with a Boston salesman, visited a New England manufacturer. This manufacturer told the salesman that he was not interested in domestic wool. The sheepman was surprised, and asked why this was so, and received the reply: "It is too unreliable for me to use to advantage." He then explained to the sheepman that by "unreliable" he meant it was so full of filth; that the various qualities were mixed beyond perfect separation; that it was tied with fibrous twine and heavy with paint; that he could not guarantee the quality of tops as he could those made from foreign wool; that he could not depend upon a given weight of American wool yielding a certain percentage of tops, and that, therefore, he had discarded domestic wool altogether. That manufacturer does not know how much he contributed to the present Western awakening. The sheepman went away and thought about it, and dreamed about it, and the dream was realized last spring in the shed that arose in the sage brush of Wyoming.

SKIRTING AT TABLE IN FOREGROUND CLASSERS' TABLE IN BACKHGROUND

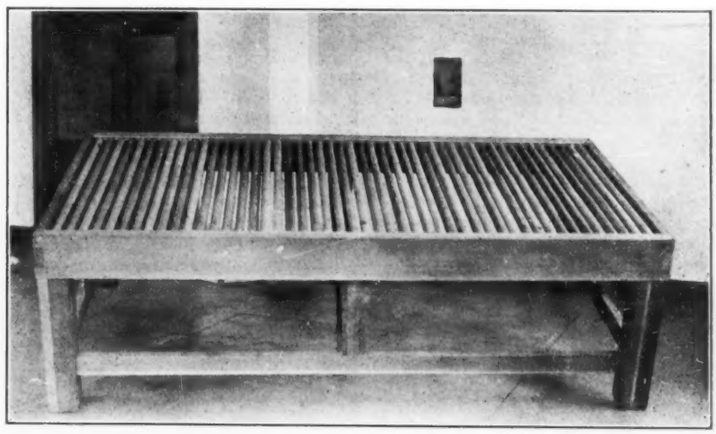
The same sheepman visited the manager of the Clark & Wostenholme mill near Philadelphia, and upon being introduced the manager told him that he had made from a certain clip of wool from Carbon County, Wyom., tops which could not be distinguished from those made from Australian wool. The sheepman went away convinced that it must be the antiquated method of packing, and not the quality of the wool, that prompted buyers to say that Australian wool was so much more desirable than domestic.

It will be next in order for us to eliminate the paint evil. When the owners of the wool at the Pioneer shed saw their fleeces thrown upon a rolling table they realized for the first time the excessive amount of branding paint used. Reform in this regard will come slowly, but it will surely come.

In a broad sense, the establishment of Australian shearing sheds in this country, through the enlightenment and education of the sheepmen, will mean more and better sheep, better wool properly prepared for use at the source, and ultimately the establishment of Auction Sales.

A MANUFACTURER'S VIEWPOINT

The recent efforts made in the West by certain leading wool factors to classify American wools at the time of shearing, according to an adaptation of the Australian system has aroused considerable interest among both wool dealers in the East and manufacturers. Those who have purchased lots of these wools for use have expressed themselves as being well pleased by the progress already made in this direction.



ONE OF THE WOOL TABLES ON WHICH THE FLEECES ARE SKIRTED

One prominent manufacturer, who had used a considerable quantity of these wools in his mill, declared that he is very much gratified over this development. While he felt that possibly too much was attempted at this time in the way of minute classifying, nevertheless he was convinced that much would be accomplished for the benefit of the entire wool-growing industry of this country by the introduction of this method of preparing wools for the Eastern market. Furthermore, he was confident manufacturers as a whole would very quickly appreciate the advantages offered in wools so prepared, and would doubtless be willing to pay a premium for them.

In discussing the subject, this manufacturer, who is recognized as an authority on wool and its products—stated that much had already been accomplished for the wool clip of America by the gradual elimination of the use of sisal and similar twine for tying up the fleeces, which had always proved to be such an annoyance and actual loss on account of the fibers persistently appearing, even in the finished fabrics. The use of paper and other light twine has steadily increased since many manufacturers refused to buy wools tied with sisal twine.

However, one of the chief causes of complaint heretofore has been the indiscriminate packing of fleeces so that the

BITTER CREEK BALES FOR SHIPMENT

final purchaser—the manufacturer—if compelled to take the wool "as is," including a large percentage of rejects and off-sorts of a character and grade he is unable to use, increases the scoured cost of the wool. "The value of wool, from a manufacturer's standpoint, is the worth, for his purpose, of a scoured pound of the article he uses, what he may pay for the pound in the grease is a secondary matter," was the opinion of this manufacturing authority.

Domestic wools, he stated, were admittedly superior for the spinning of many yarns for the American trade. Their being packed in the Australian manner, which would insure the purchaser against securing a heavy percentage of rejects which prove an actual loss, would enhance their value in the eyes of the buyer. This fact has always caused a preference for Australian wools on the part of many buyers, because they would know fairly definitely just how much their wool was costing them. The average price for a properly classified clip is always more than the price it would bring in bulk, plus the cost of classing at the shearing floor. Being free from rejects by means of skirting and of a character required for the particular use for which they are intended, makes them worth more to the purchaser.

COMPARATIVE SHRINKAGE LOSSES

As a comparison of the percentage of actual loss shown in an average western wool shipment, and a lot of Australian wool, the following table is given:

Sorting Test.

10 Bags Soda Springs.		
103 lbs. 7s.		
1,919 " 6s.	2,496 lbs. net.	
144 " 5s.	2,447 " "	
151 " 2s.		
17 " Seedy.	49 lbs. net.	
2 " Gray.		
62 " Shorts.		
14 " Strings.		
35 " Clip.		
2,447 lbs.		

Scouring Test.

6s Soda Springs.
Grease.
1,226 lbs. net.

Scoured.	Reweighed.
595 net.	598 net.
51.46%	51.22%

An analysis of this lot showed:

Cost, 18½c.
Loss in weight, 1.96%.
Shorts, Strings, Clips Low, etc., 11.25%.
Main Sorts, 86.79%.
Actual cost Main Sorts, 20.06c.
Actual shrinkage of Main Sorts from total weight of wool purchased, 57.89%.
Shrinkage, net weight of wool scoured, 51.46%.
Cost of wool, 41.32c.

Sorting Test.

2 bales of 50s Australian Crossbreds.		
9 lbs. 7s.	570 net.	
553 " 6s.	565 "	
2 " 5s.		
1 " Shorts.	5 net.	
565		

Scouring Test.

50s Australian Crossbreds.

6s Grease.	Scoured.
554 net.	350 net.
	36.70%

The analysis of this lot showed:

Cost, 28c.
Loss in weight, 9.87½%.
Shorts, 0.17%.
Main Sorts, 98.96%.
Actual cost Main Sorts, 28.29c.
Actual shrinkage of Main Sorts from total weight of wool purchased, 37.36%.
Shrinkage, net weight of wool scoured, 36.70%.
Cost of wool, 44.96c.

VALUE TO MANUFACTURERS AND GROWERS

In preparing clips it may be well to avoid making classes of fleeces that result in such small quantities as to send little lots to the "Bargain Counter" or to the fate that often overtakes such when they become what are known in the London sales as "Starlots."

Such a system would not only benefit the manufacturers, but also the wool growers, say the manufacturers. They should certainly soon recognize the increased value accruing from the improvement of their clip by the elimination of those sheep producing short, frowsy, or run-out fleeces. They will take a greater interest in the breeding of their sheep, and raising the standard of their flocks as this will in turn increase their profits. Such conditions should go far towards making the American wools of a superior character able to meet competition in any wool market of the world.

The Italian Wool Industry

By Raffaele Sansone

DURING the past three years the Italian wool industry has gone through three different periods, that before the declaration of war between the European powers, that during which Italy remained neutral, and that since this country joined the Allies.

Before the war, owing to the development in the spinning and weaving of woolen goods, principally in the provinces of Piedmont, Lombardy and Veneto, the Italian wool industry had much better prospects before it than cotton manufacturing or many other industries that were going through very difficult times. Further extension would have been possible in the manufacture or treatment of washed or scoured wools, in the manufacture of combed wools, in the manufacture of woolen yarns or fabrics of all qualities, in the rearing of goats, sheep or other wool bearing animals.

Wool scouring was tried on a fairly large scale some years ago, but owing to the too severe competition from abroad the business could not secure a firm footing in any portion of the peninsula. After the failure and closing up of two of the principal concerns carrying out this process, the business was practically abandoned. Scoured wools had to be imported principally from France, which supplied us with 1,630 tons of wool in 1913. Over $8,000,000 worth of worsted tops was consumed in Italy, of which about $5,000,000 worth was imported. In 1913 3,270 tons of combed tops were imported from France.

The value of the raw wool production before the war did not reach $8,000,000, and it was necessary to import large quantities from abroad. In 1913 3,460 tons of raw wool were imported from Argentina and 2,440 tons from Australia. Woolen waste to the amount of 1,550 tons was imported from England, 1,540 tons from Belgium, and 1,230 tons from France.

A group of Sicilian deputies, with a view of encouraging an increase in the rearing of sheep, goats and other wool-bearing animals, tried to secure a law placing a high import duty on raw wool. The project had, however, no success and was soon dropped. The Italian wool mills before the war were unable to satisfy the home demand. England and Germany in 1913 supplied us with 2,310 tons of wool yarns and fabrics.

During the first few weeks of the war the Italian wool goods markets were upset completely, as there was a general feeling of uncertainty whether Italy would be drawn into the struggle. All business with France, Germany, Austria and several other countries was suddenly cut off. Large orders were soon given to the Italian wool industry, the government, seeing the necessity of increasing its permanent army to at least one million men, made contracts for the equipment of this army. All the mills that could supply such goods were soon working day and night to supply the home demand, neglecting the orders from their old clients in Italy and South America. The export trade was lost because of a royal decree that forbade the exportation of wool and half wool goods.

The Italian wool industry had to contend during this period with long delays in the delivery of raw materials, that had been paid for in cash at enormous prices. The trouble was increased through the discharging difficulties at Genoa, in the port of which city goods of all natures and from all countries were rapidly accumulating, owing to the lack of freight cars and ships. The wool manufactories of the province of Veneto were amongst the chief sufferers, as navigation on the Adriatic sea was rendered precarious and dangerous through the presence of Austrian mines. Later, when an export prohibition was placed by the British Government on English wools and on those coming from her colonies, only allowing the passage of certain quantities of merino wools, deliveries of all other wools from London ceased.

The Italian industry was in a serious condition. Its difficulties were, however, not to stop here, for they were increased still further by the ships being detained at Gibraltar that were transporting large quantities of South American wools, purchased as substitutes for Australian crossbreds. The wool manufacturers, with orders for the army and navy, as well as for their regular trade, were thus forced to purchase any quantity and quality of wool to be found on the home market, paying absurdly high prices. There was a time during this period when the manufacturers of wool goods were in danger of being forced to close their works. This was, however, avoided through the good will of England, who allowed the passage of the Argentinian wool through the Strait of Gibraltar, on receiving a formal guarantee from the Italian Government that the wool would be used for the interior consumption and not for exportation to the countries of her foes.

During 1914, the exportation of wool goods from Italy was reduced to 1,779 tons, whereas a reduction of 9,000 tons took place in the imports principally raw and washed wools. During the first three months of 1915 the importation of raw wools rose to double what it had been in the same period of the preceding year, and it was at this time the Italian wool industry began to recover. The importation of washed wools during the above period having dropped to about half what it had been in the same period of the preceding year, a certain number of establishments were encouraged to attempt wool scouring in Italy. They were able not only to satisfy all requirements in the peninsula, but even export to France a portion of wool. There was a marked decrease in the importation of wool yarns and textiles. There was a large increase in the exports of woolen blankets and special carded fabrics. Since the entrance of Italy in the field against Austria all exports of new wool have ceased, partly owing to the export prohibitions and partly because of the home requirements.

The exportation of cotton goods containing a limited percentage of wool is still permitted. Since that time the scarcity of raw wool that had so seriously embarrassed wool manufacturers, has been relieved. Wool is now coming in large quantities from South America and Australia. Wool rags are also arriving in large quantity. The principal difficulties encountered at present are the lack of dyestuffs, the insufficient production of tops, the insufficient production of military fabrics for satisfying the pressing immediate demands, and the great need of certain woolen knit goods.

The lack of dyestuffs is perhaps the most serious of these difficulties. For producing the greenish grey required for the military clothes many dyers are using mineral and natural colors. One Italian firm has even been able to supply an artificial color. An English firm is still sending to Italy a color that is very useful for the above purpose. Such supplies are, however, only a very small thing in comparison with what is required, and there is a good opportunity for America to export to this country such colors as logwood, hematine crystals, fustic, flavine, redwoods, yellow woods, cutch, etc.

The insufficient production of the Italian mills has created the necessity of placing large orders abroad. Many of these have, however, fallen through owing to the high prices demanded, or for other reasons. Large orders for cotton and wool mixed goods have been received from France. Woolen knit goods are at present in such demand that everybody who can knit is making stockings, gloves, vests and underwear, etc. The demand is, however, too large to be satisfied in this country. The Italian troops have been in the mountains in contact with snow and water all summer. The soldiers' clothing cannot be washed or mended, and has to be thrown away, being replaced at once by new goods. Every effort is being made to import wool goods. These goods are principally woolen knit goods such as stockings, neckties, underwear, hosiery, head covers, vests and drawers. Here would also be a chance for Americans to aid the men who are suffering most severely through cold and in many cases are crippled for life through the freezing of arms, legs, or other portions of the body. A quantity of such goods was given last Christmas for the children of the nations at war. Ship loads of such goods would be used up at once in relieving thousands and thousands of sufferers.

ENGLISH NOTES

(*From Our Regular Correspondent*)

The business of interviewing government officers in London in regard to the contracts placed in the United States for account of the Allies, fell to J. H. Kaye, of Kaye & Stewart, Huddersfield. His representations have been conveyed to the Allied capitals by letter and the officer of the Italian government allowed the delegate to understand that no more orders would go from Italy to American mills. Some Italian contracts for small quantities and six million yards from Russia have been placed in this country in the second half of November. Some misunderstandings on the part of the Italians have been cleared up by private treaty, but the exact circumstances under which British firms allowed the previous batch of orders to pass them have not been explained.

The question of what Yorkshire manufacturers of high-grade fancy worsteds are going to do to meet the changed circumstances brought about by the war has received at least a partial answer. Two of the most renowned Huddersfield concerns have made their preparations for going into carded woolens. This departure is naturally of the greatest interest to Scotland and the West of England, which have hitherto had a monopoly of the highest class of tweeds. As both the Scotch and the West of England mills long ago branched out into worsteds, they can hardly complain of the invasion of their presence. The new competition that they will have to meet will be rather in quality and design than in price.

So far as the intentions of Kaye & Stewart and of Martin Sons & Co., Ltd., are known, their idea is to make fine soft-handling Saxonies, and it is possible these will be worked out in the quiet Huddersfield styles, rather than in the bolder Scotch fashion. They will be able, of course, to use shorter wools than those taken for the combing trade and probably to buy merinos of a type that have hitherto been left to the Continental market. It may be also that a special effort will be made to catch a trade in women's costume cloths that has been catered to in Germany in the past.

Tweeds and worsteds are to some extent inimical, and in tweed seasons the spectacle has been seen of Huddersfield worsted manufacturers making their designs as much like tweeds as possible. The Scotch firms went into worsteds in order not to have all their eggs in one basket and the Huddersfield mills have a similar motive, all the more urgently felt now that their old business is permanently curtailed.

The original trade of the Scottish Border mills lay in cheviots, and they are still buyers of all the wool that the cheviot district produces; a peculiarly springy and bright wool which is not exactly replaced by any Colonial crossbred. The Saxony trade was added later, and, as the name indicates, it began with wool from the Saxony merino breed now replaced by Australian merino. The Saxony branch is a very important one to the Scotch mills and some interest will be taken in the steps that they adopt in self-defence. The original trades, both of Huddersfield and the West of England, were carded woolen, and the latter established its reputation hundreds of years ago by employing Spanish merino wool and using greater skill in finishing fine-faced cloths than manufacturers in the north.

This particular skill, by the way, is attributed by old writers to men who brought it from Louvain. Since the reduction to small dimensions of the old trade in meltons, beavers and other plain cloths the West of England has produced teazled fancy woolens, fine flannels, whipcords, tweeds made from down wools and high-grade worsteds. The reputations, both of Scotch and West of England tweeds, are ready-made, whereas, that of Huddersfield is yet to be built. Huddersfield woolens have been of the medium and cheap (Colne Valley) grades, but it is not expected that the new productions of the fine-cloth manufacturers will have anything at all in common with them.

It is not altogether uninstructive to notice the development of British trade with France in wool textiles. Comparison is made below of the exports of ten months at periods two years apart:

	1913.	1915
Worsted yarn, pounds	1,169,100	3,134,200
Woolen tissues, yards	4,856,500	38,780,000
Worsteds and stuffs, yds.	1,224,000	4,258,900

Knit Goods Feel Extremes of Good and Bad Trade

Hosiery Pulls Through Hard Year

Dyestuff Scarcity and Sluggish Buying Have Hampered Trade

EXCEPT for improved conditions toward the close of the year's last quarter, 1915 has been an unsatisfactory period for the hosiery manufacturer. He has had an uphill fight to secure proper profit for his mill, he has found buyers unresponsive and he has had to puzzle out for himself problems without precedent and with many obstacles to solution. He has faced a depressed cotton market and a radically increased dyestuff cost, the former rendering buyers cautious and insistent on low quotations, the latter adding radically to manufacturing expense and making the concessions asked for by buyers absolutely unreasonable. The one word that stands out as the feature in all conversations on the market during the year is "dyestuffs" and lack of the proper sorts has retarded production in many quarters. Up to September buyers ruled the situation and mill agents were forced to cater to them if they would secure any business at all. Buyers then claimed great success for their hand-to-mouth policy and forwarded small orders as they sold goods to retailers that mill agents would not have considered for a moment under other and more prosperous circumstances. Sharp competition among mills for a share in the small business that was going around was also a weakening factor and resulted in an abnormally low level of prices which it was hard to get away from. In September and October the complexion of raw cotton changed considerably and in November and December vastly improved business, prices and spirit were visible throughout the hosiery market. Rising cotton brought buyers out of their reserve and gave sellers a bull argument about which there could not be the conflicting opinions such as marked many dyestuff controversies. The market has gotten on its feet and on unquestionably improved demand prices have been advanced to a better parity with the cost of raw materials.

THE DYESTUFF PROBLEM

The fact that the various fast blacks were among the scarcest dyestuffs in the chemical market during the year hit hosiery manufacturers in particular because such a large proportion of all hosiery is finished in black. Sulphur black, which is perhaps the most satisfactory dye for good grade hosiery, rose to about $4 per pound and it was scarce at any price. Its advance placed it beyond the pocket books of manufacturers of low and medium-priced goods and eliminated their demand, but even so there was not enough to go round among those who were able to pay for it. Last fall a domestic dye plant took contracts to deliver sulphur black, which it had begun to produce, at 80c. per pound, but like many of the other dyes sold on contract by American makers this price was open only to those who would contract one to three years ahead. The same company put out a direct black at 60c., which was taken eagerly by manufacturers of medium-priced goods. August deliveries of this pigment were disappointing and mills which had trusted this to get out their production were placed in an awkward position. Conditions have since improved. The increased use of aniline oil for oxidized black has been a result of the dyestuff stringency and this is giving satisfactory results on the heavier weights of goods. The production of aniline oil is simple compared with that of some of the needed colors and several mills have producing plants of their own. In the early part of the year many experiments were made with logwood on cotton, but it did not prove a success. Jobbers rejected deliveries with that finish and manufacturers gradually turned their attention to other things. On wool socks logwood is more satisfactory as it seems faster on the animal than on the vegetable fiber.

LOWER END COTTON GOODS

Cotton hosiery, such as retails from 10 to 15c., passed through a most unsatisfactory period which did not end until the late fall. During the spring and summer home trade demand was light and much of the business put through developed into unpleasant controversies because of buyers' dissatisfaction with the finish. Mills were anxious for business and prices remained depressed. Several mills which saw fit to take orders at ridiculously low figures weakened the whole market, for others had to meet their offerings in order to remain in the game. Beginning in October improvement swept over the face of things, and, with better demand in evidence, the market began an advance. By December buyers were taking all they could get for nearby delivery, paying 60c. for what they had hesitated to pay 52c. two months before. The advances had come frequently, in jumps of 2½c. at a time, and some agents were unwilling to accept any orders until confirmed by the mills. Coarse 84-needle half hose has been the market football, being raised to abnormal heights by speculative buying on foreign army contracts last winter and spring, when the rest of the market was depressed, and falling flat when this demand ceased and heavy stocks were left which could be moved into domestic consumption only at so low a figure as to net a loss. The market at the year's close on 84-needle half hose is flat. Agents notice a marked increase in demand for 15c. goods during the last two years and mills are adjusting their production to it. Less 10c. goods are now produced and considerably more 15c. goods than 18 months ago. Exports are proving a great support to many lines of cotton hosiery and increasing volumes are being sold abroad.

ARTIFICIAL SILK HOSE A FEATURE

Last spring and summer the demand for artificial silk hosiery broke all past records. This merchandise had been offered during 1914 for spring, 1915, and was bought with fair freedom. It took with the consumer more vigorously than many jobbers anticipated, and, as a result, there was large buying of artificial silk goods last March, April and May for nearby distribution. When the market came to open for spring, 1916, these goods were without question the leaders. In past years 25c. had been about the lowest retail price, but 1915 saw this class of hosiery as low as two-

(*Continued on page* 199)

Underwear Emerges from Depression

Jobbers Finally Shake Off Reserve and Year Ends With Optimsim

THAT a change of spirit, price trend and business can be made quickly, and that mill agents can be in the height of optimism less than a month after they have been most depressed, is demonstrated by the course of events in the underwear market during the year of 1915. Taking the year as a whole, the trade cannot but remember that three-quarters of it was an uphill fight against all sorts of depressing influences. Healthy demand did not make itself felt with force until September. It has, however, during the year's last quarter so settled itself in all divisions of the market that selling agents believe that "good times" are assured for a twelve-month at least, and they look on this change in tone as the year's prime achievement. From the manufacturing end the year's total results are not wholly satisfactory, because there was so much part time operation during the summer in a number of underwear centers. It has not been considered an intelligent policy to manufacture goods to stock, and the majority of mills operate only against orders. The scarcity of orders during the mid-year months resulted in curtailment, the effects of which have only recently been effaced by the full and profitable employment now being given to practically all of the industry's machinery. The new year prospects are encouraging to the mill man, and he is hoping on good foundation that he has put the problems and difficulties of the last two years behind him. In some quarters of the market production for the coming seasons is acknowledged to be oversold, and the mill man can now turn his energies from preventing losses to making profits.

TWO DIFFERENT OPENINGS

In the calendar year of 1915 two new seasons were opened, those of spring, 1916, and of fall, 1916, and the character of each opening was largely determined by the temper of general business at that time. In June the dry goods outlook was still bearish, and the opening was marked by irregular buying and by cut-price competition that made reasonable profits out of the question. There was much discussion at the time on the injurious effect of absolutely unregulated competition, and from many influential sources came suggestions for associated action of a sort that would not conflict with the existing anti-trust laws. But on the part of those mills from which the weakness originated there was little interest, because, of course, they thought that the reductions were a necessity, if not a good bit of business policy, and the criticism arose chiefly from those who had to meet the low prices. Well-informed agents, however, believe that these sellers' panics are a bad thing for the market, in that they unsettle the buyer and give him no confidence. In November came the fall opening, and again current trade was reflected in the spirit of the initial business. This was decidedly cheerful; buying was on a large scale and advanced prices were well supported. There was little need to call out for firmness on quotations, because trade was again on a healthy basis.

BALBRIGGANS IRREGULAR

Balbriggan trade was depressed through the greater part of the year by sharp competition. There is a large production to be disposed of annually, and as distribution on the whole does not seem to be broadening, there is a rush on the part of manufacturers to pick up as much business as they can. Buying of bals early in the year was sluggish and only in the spring did it gain any show of briskness. This was caused simply by a mass of small last-minute orders that did little in improving mills' condition. The opening in June for spring, 1916, brought to light some low prices which certain mills felt that they must meet. As a result there were several downward revisions which unsettled buyers' confidence and put a damper on large scale future buying. That jobbers were merely waiting until they could be sure of a firm market back of them is indicated by the heavy reorder business which poured in during September on strengthening cotton and a 5c. advance on the 25c. bals. Since that time there have been further advances and the market on 4 to 4¼ pound goods now stands 10 to 15c. higher than at opening. Certain mills named an opening price which was in anticipation of a lower cotton basis in the fall, whch never materialized and it is believed that part of the merchandise sold will be delivered at a loss. Competition with other lines is also a factor in depressing the market for nainsook garments, and union suits are cutting in considerably on the distribution of two-piece balbriggans. In 50c. bals nainsook competition is particularly noticeable, and distribution of the knitted garments is being adversely affected. Mesh underwear is not the factor in the trade that it was two years ago and the total annual sales are said to be decreasing.

COTTON RIBS' VAST IMPROVEMENT

The manufacture of cotton ribbed underwear is one of the divisions of the market in which selling agents note expansion. The first six or eight months of 1915 recorded a set-back for this class of merchandise, but since September mills have been pressed to their full capacity to satisfy demand, and forward orders now on the books indicate assurance of a good season to come. Ribs were opened in November, 1914, at figures lower than any seen for a number of years, the 11-pound shirt being quoted by various mills from $2.90 to $3.50, and 16-pound union suits ranging from $5.50 to $6.75. Buyers were in a peculiar mood and initial ordering on the road and in New York was light. Small orders filtered in during the spring and summer, and as a result many mills were forced to curtail. That jobbers had misjudged the situation, however, became evident near the close of August, and much buying was done on a rising market. In November mills were behind scheduled deliveries and spot demand could not be satisfied. The openings for 1916, coming in a period of improved trade, were successfully made at advances of 25c. to 45c., and initial orders secured on the road were of good normal volume. Southern 11-pound goods were priced at $3.40 and $3.50, and eastern at $3.50 and $3.62½. There has been a steady improvement in the quality of merchandise made in the South

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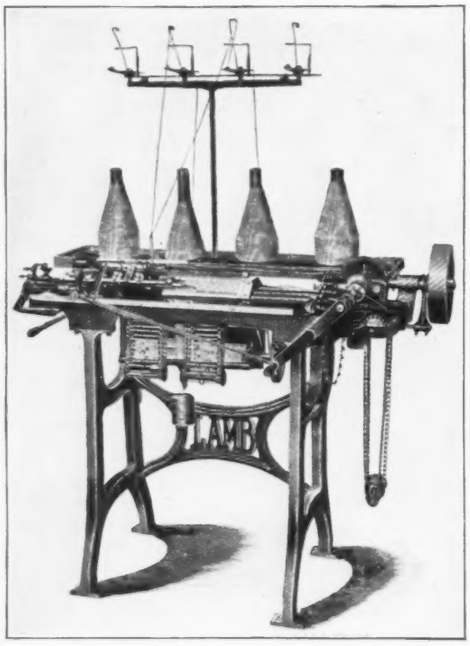

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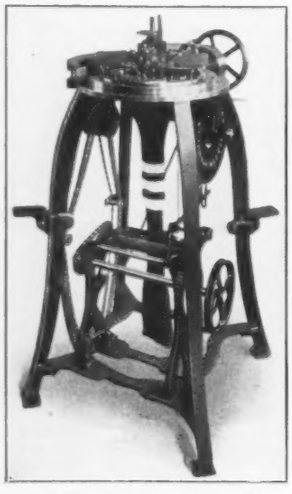

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during the last few years, until now southern mills claim to equal, if not surpass, the eastern product price for price. The quotations now current on men's underwear show a difference of 10c. per dozen between lines from a representative southern and a representative eastern mill, instead of one of 22½c., such as existed several years ago. One of the results of this is said to be a greater localization of mill distribution as the matter of freight has become a factor in the closer figuring.

EXPORTATION FLEECE FEATURE

Export selling on a large scale has been the feature and the salvation of fleeced cotton underwear. A year ago large sales of men's fleeces were made on foreign army contracts, and during 1915 a heavy demand from the civilian trade of Europe was roused, which at present gives every indication of continuing. Fleeces opened the year with the greatest strength of any division of the market, naming prices in December and January instead of November as usually, and on the better grades at least holding to figures considerably above a parity with cotton. Substandard fleeces suffered sharp competition among themselves and were priced as low as $2.90. Fleeced goods mills were indifferent to the home trade because sold three or four months ahead for export. During the spring women's knickers or bloomers of fleeced fabric became a feature of the trade. They were especially made up for the English market and served to keep many knitting frames busy. Large mills sent their own representatives abroad, and in some instances are said to have quoted prices in shillings and pence, f. o. b., Liverpool, with October dating. The fall in exchange endangered the profits on some of this business, but by the time the bills came due there had been a fair recovery. Several mills were able to start operations which had been closed down because of lack of business, and others made enlargements to take care of their extra trade. This fall brought forth openings for 1916 at prices continued from the previous season on the better grades, but advanced about 20c. on the substandard lines. To maintain full production of this branch of the industry export trade must be continued, because home consumption of fleeces is reported declining year by year.

WOOLENS ARE IRREGULAR

The year in woolen and worsted underwear has been irregular, with many problems to annoy manufacturers regarding their supply of raw material. In flat woolen underwear the year began better than it closed. Last winter mills were at work on foreign army contracts, a class of buying which at present has fallen into the background. These army contracts gave the mills confidence, which was doomed to disappointment when they again came to rely solely on the home trade's support. Despite the lack of snap to this division of the trade, raw wool itself has been advancing, and manufacturers find themselves compelled to turn out the best garment that they can at a price. Agents say the trouble with the market is overproduction; if there were about three less mills in operation, demand and supply would meet on a healthier basis. Worsted garments in ribbed fabric have passed a better season on the whole than the flat wools, even though the advance in prices of raw materials has hit them more directly. Buyers were slow to submit details and confirmation early in the year on their initial orders, but a few advances in price brought them around. Worsted union suits have been fairly popular numbers. Wool and worsted garments as a class, however, are suffering from the modern trend toward lighter underwear. Men today dress for winter out-of-doors with sweater and overcoat, rather than with heavy underwear.

WOMEN'S GOODS IMPROVE

Vast improvement is to be noted in comparing the year's close with the year's beginning on women's underwear. Initial ordering for fall delivery was light. Jobbers bought enough to supply their road men with samples and took the bulk of their supplies on reorders. For spring this worked to their fair satisfaction, because distribution still was light and manufacturers were not in a strong position, because they were still in need of business. The opening for spring, 1916, was made at an attractively low basis on all lines, but agents found themselves hampered because of weakness in balbriggans. Buyers would tell them that they were securing bals at reduced figures, and although agents for women's vests and combinations failed to see the logic, they felt the resulting slow buying. It was not until the general bullishness of September came to light that business grew to normal size and advances were possible. This was true on spring goods and it was equally marked on fall merchandise. Jobbers found their current stocks altogether too small, and they began operating on such a scale that mills were very soon sold up. One mill, which had made up the knitted fabric in the roll during the summer instead of shutting down for lack of orders, had its finishing department working overtime getting out the garments for which demand had so suddenly returned. Women's 8-pound ribbed union suits were particularly scarce, and several advances brought some of the garments up to $3.50. Buyers wanted shipments by express, but rarely could get them, and one manufacturer tried to buy from another manufacturer to fill his orders. The opening for fall, 1916, was generally satisfactory, and good advances were obtained. Desirable lines of union suits are already practically sold up for 1916.

SWEATERS MAKE PROGRESS

Call for Artificial Silk Goods Year's Feature

Sweaters as a class have passed through a puzzling and irregular year. For the greater part of the time staple numbers were dead issues and manufacturers were at a loss to figure any future for themselves at all. At the opening of fall season initial business amounted to comparatively little despite the fact that low prices were quoted and the prospects on wool and worsted yarns were decidedly bullish. These prospects developed into facts as time went on, and even last spring when scattered attempts were made to secure advances, there was no support to the market. Jobbers claimed that retailers held all the woolen and worsted coats they needed, and in the rush for silk and fiber garments, they were neglected. The few orders that did filter through on woolen and worsted sweaters were absurdly small, some being for fractional dozens. Agents realized that these were simply retail orders and in a better season would have refused to accept many of them. Last fall, however, brought to sweaters, as it did to many other print goods lines, a sharp improvement. Jobbers had remained short of the market too long, prosperity came upon them unaware and sent them scurrying to agents for quick shipments of goods from stock. They would take almost anything and in several quarters stocks held for over 12 months were moved out quickly. In women's goods anything up to $48 per dozen was in good demand, with the plain stitches in preference.

SATISFACTORY OPENING

Despite the difficulties in figuring into 1916 on raw stock and dyestuffs, sweaters were opened in November and a better initial business booked than had been received for a number of seasons previous. Worsted-plaited garments, which had been slack sellers through the year, were opened at advances varying from 50c. to $4, making prices from $17 to $22.50. Part of this irregularity is accounted for by attitude on dyestuffs, or whether or not colors are guaranteed. As a matter of fact few sweater manufacturers are committing themselves on colors, because the yarn dyers on whom they rely will in turn offer no future guarantee. Cotton sweaters opened at advances and were quickly sold up. Most of these lines, it is said, were shown only in gray; maroon was offered in several quarters and navy's were scarce. Instead of the cheap all-wool coat, which was formerly priced at $12, jobbers have been taking a merino garment at about the same figure, as the all-wool goods have advanced so as to be out of range.

RUN ON SILK SWEATERS

The feature of 1916 in sweaters is without question the great vogue of silk and fiber garments. These had been shown in the most expensive ranges during 1914, but for spring 1915 they came out at popular prices and were actively sought on the primary market. The silk yarn was in many instances plaited with worsted or cotton, though some of the artificial silk sweaters were made from that yarn alone. In the early months of 1915 artificial silk was selling around $1.80 per pound, by spring it had advanced to $2.20 or more, and in the fall it was over $3. The advance of the raw material helped to decide hesitating buyers and no mill which could turn out silk sweater coats lacked business. The garments are chiefly for women and are dyed in the high colors. Numerous stylishly cut designs were shown, many with pockets and belt or sash.

FANCY KNITS CLOSE WELL

The year closed with improvement in many other lines of fancy knit goods which had been laboring through a period of depression and dulness. Knitted gloves, in particular, after an irregular year booked a record business during the fall, much of it for 1916 delivery. Worsted gloves at $1.80 to $3.50 are in better demand than has been seen for sometime, and the fact that importers have been buying ahead from domestic mills seems to indicate that foreign goods will be less of a factor than usual. Silk gloves are in their usual good demand. Knitted scarfs and skating caps are meeting a vogue such as has not been experienced in recent years. Retail demand for scarfs of brushed angora has been large, and unless distribution has been overestimated they will be good for another season. Bathing suits sold indifferently for last spring and for this spring, although demand may be better the question of dyes is an unsettling one.

HOSIERY REVIEW

(*Continued from page* 195)

for-a-quarter. Numerous mills swung as large a part of their production as possible over to their manufacture and they were swamped with orders last June and July because of the popularity of the merchandise and because of the evident bullish trend in the raw material. It is the opinion of agents that the market oversold itself and deliveries cannot be made on a large part of the business. This is especially true of mills which did not cover ahead on the raw material, for in a few months this had jumped from $1.80 to $3.60 per pound. As the year closed hosiery opened at $1.75 was held for $2.30 in one quarter where a little was available, and the opinion is expressed that under present conditions 35 cents is the lowest figure for which these goods can be made to sell. Mercerized cotton goods were sluggish when the silk demand was at its height but agents believe that mercerized will be good property next Spring when there are not enough cheap silks to go around. Last summer certain agents believed that they sensed an overproduction of mercerized goods, prices were low but mills kept turning the goods out in belief that they would benefit together with fiber hosiery in the demand for glossy effects. Since the summer, however, export trade has proved a valuable aid in distributing mercerized goods, and there is no longer fear of overproduction.

WOOL GOODS' FAIR YEAR

Wool goods passed through a fair year, though at many times endangered by rapid rises in raw material. Coarse woolen socks began 1915 with the false prosperity injected into more than one commodity by war orders. When these fell off, however, mills were fortunate to get a fair business from the home trade, which brought them through the year without depression. Buyers were willing to operate further ahead on wool hosiery than on cotton, because of the different position of the two raw material markets. No foregn army contracts have been reported this fall, and yet wool goods sold well, and what spot lots became available were readily disposed of. Openings for next fall were made after Thanksgiving in several quarters at advances of 5 to 10c. on merino goods. Compared with the year before these figures are low, and they were apparently so recognized by jobbers, to judge from the reports of active selling, one line being sold up and withdrawn after a few weeks. Two-pound merino socks, which were priced at $1 in November, 1914, should, on the raw material basis, have been advanced to $1.20, for shoddy was up 8c. per pound and cotton 4c. Cashmere hosiery was scarce during the fall and was advanced in price before all the last minute duplicate demand was placed. Worsted yarns have risen even more, proportionately, than has wool, so that stiffness in cashmere goods is not to be wondered at. A new feature in this division of the market developed during the year's last quarter in the form of export business with Canada and England. Agents believe that this can be only a temporary trend, because normally England can undersell America on wool goods, but they welcome it nevertheless.

FASHIONED GOODS SPOTTY

Demand for full-fashioned goods throughout the year has centered on those of the better grade and merchandise of this sort around the $1 retail price has sold unusually well. Cotton goods in the fashioned class have suffered from the influences that affected cottons of the lower grades, despite the fact that imports, especially in the latter half of the year, fell to almost nothing. Several of the fashioned goods mills closed down during the summer due to the combination of slack trade and high dyestuffs. As the year closes this branch of the industry is improving along with the rest of the trade. Agents are taking more orders, but at least one representative house feels that it is not wise to commit itself definitely on deliveries and it is not so doing, accord-

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ing to report, in its contracts. In the more expensive silks, clothing is an almost vital necessity, and at one time during the year there was reported an almost alarming scarcity of clocked hosiery in retail circles. Raw silk has advanced considerably and spun silk also, with the result that this division of the market is still on a basis of high materials and good demand. Fancy effects have passed an irregular year being reported in some quarters better than for a number of seasons, in others, unimproved. Many new colors came to light last spring such as sand, putty, champagne, etc.

HOSIERY EXHIBIT BENEFIT

(*Continued from page* 54)

date, each succeeding one growing in volume and importance.

The original purpose of the National Association of Hosiery and Underwear Manufacturers in developing textile exhibitions was to increase the attendance at the annual gatherings, so as to insure a larger representation from the knitting manufacturers at the various sessions of each convention. How well this result has been accomplished is attested by the interesting meetings each year and the wonderful growth of the association.

The hearty co-operation and support tendered by the exhibitors, and their anxiety to further aid and support the association in its work, was cheerfully acknowledged by our officers, and in recognition thereof a provision was made whereby associate membership privileges were extended to our friends who either took advantage of the exhibition features or who otherwise felt disposed to encourage our work.

"It gave us the best advertising we ever had, and brought business that we probably would never have gotten through regular channels," is a bona-fide expression of one of our 1915 exhibitors. All other exhibitors must have had similar experiences from the fact that they are participating in our exhibitions from year to year, many of them increasing the size of their spaces the longer they enjoy these privileges.

Why shouldn't our exhibitions be both successful and profitable? Our association has always enjoyed the high respect of all branhes of the textile trade and allied interests, even though some few manufacturers have not taken an active interest in the work.

The associate members (this includes exhibitors as well as those who otherwise contribute their moral and financial support) have found from practical experience that they can meet personally and under the most favorable auspices, at a minimum of expense and in a short time, all the prominent knitting manufacturers of the country. This statement is made advisedly, for the reason that it is the broad-minded, progressive manufacturers who rub shoulders with their brother competitors who make of themselves factors in our great industry.

The live, progressive knitting manufacturers more and more appreciate the opportunities afforded by our annual conventions and exhibitions. A strong sentiment is growing in the direction of also making our annual gatherings occasions where the jobbers and other distributors will be represented, when contracts for manufactured goods for the ensing year will be placed, and when, too, war or no war, we hope to have American exporters and foreign buyers meet with us to select from exhibited goods or arrange with manufacturers with whose lines they are familiar for the requirements they are called upon to supply. Some prospects! But why not?

PROTECT DOMESTIC MARKETS

PHILADELPHIA, JAN. 11, 1916.

Editor of the Journal:

The man who is willing at this time to forecast the future must have a great deal of confidence in his own judgment and foresight. It is of course obvious that the fearful struggle now devastating Europe is destroying not only a large part of the accumulated wealth of the nations engaged in it, but also placing upon their shoulders enormous burdens of indebtedness and at the same time stripping them of their most virile manhood.

But who can predict the measure of their recuperative power? Will they be so exhausted that a long period of inertia must ensue, as in the case of our Southern States, or will convalescence be accompanied by a feverish activity that will put up the price of their labor? Who can tell? But if the former, how will they meet the interest obligations on the national debts they are incurring? And if the latter, what have we to fear from their competition? I cannot venture an answer to these questions, although I incline to the belief that Europe will make a rapid recovery.

In any event the only way in which the prosperity of this country can be jeopardized from without is by competition which we cannot meet, and the consequent demoralization of our own domestic business. In my judgment such competition is more likely to come in the not very remote future from the Orient than from a rejuvenated Europe. Be that as it may, the one protection for this country is a tariff that will secure for it a monopoly of its own markets.

Very truly yours,

FRED. W. SIMONS,
of Simons & Struve.

AFTER THE WAR, WHAT?

MT. VERNON, ILL., Jan. 10, 1916.

Editor of the Journal:

No man can foretell all the effects on our country of the stoppage of the European War. The world is bound to be different after it is over.

If we, as the people of the United States, are to cope as a nation with the other nations of the earth we must realize as individuals that each one of us is a unit of the nation and must do all in our power to make our nation more efficient and more self-sustained. All lines of industry must be developed within our own borders and any changes in our laws that may be necessary to foster and encourage this condition should be made at the earliest possible moment.

This is not only necessary from the standpoint of economic prosperity but so that we may as a nation be prepared for our own defense.

World peace is a fine ideal—we're in the midst of the teaching—"Peace on Earth, Good Will toward Men"—it has been taught for almost two thousand years. An overwhelming majority say it is the correct thing—but the policeman is still on the job and jails are a necessary part of our civilization.

Therefore don't be a foolish virgin—"trim your lamp while it is yet day—gird your loins for the fray."

Trained soldiers are yet necessary—so are bullets and guns—and high explosives and torpedoes and submarines and dreadnoughts and flying machines and quinine and dyestuffs.

Appoint yourself a committee of one—to see that your nation (this big U. S. A.) is made more efficient and self-contained, and also possesses the necessary equipment to travel and trade in all parts of the world.

Yours very truly,

P. C. WITHERS,
President National Association of Hosiery and Underwear Manufacturers.

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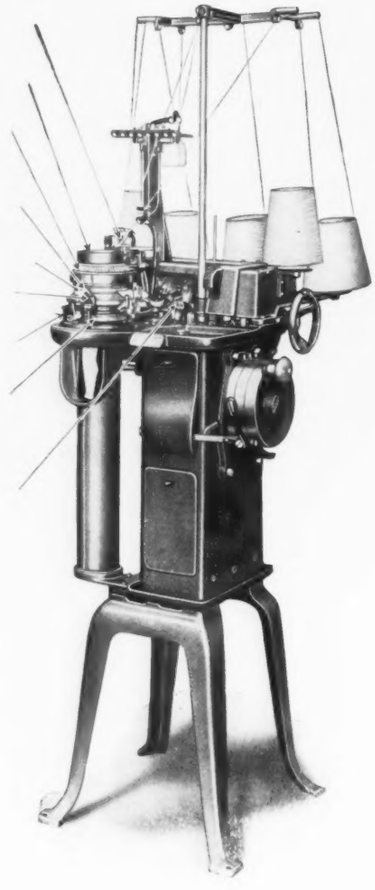

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Osaka, Japan

FIRST AID IN MILLS

(*Continued from page 50*)

to the first aid room and treated by the attendant. If the nature of his injury demands more expert medical attention, the ambulance may be sent for more leisurely and he may be removed to the hospital without confusion or excitement. Not only is there thus saving in excitement and loss of time among other employes, but the injured employe receives quicker attention than in such cases where he has to wait for the arrival of a doctor from the hospital. An example of the successful work of a trained attendant is instanced by Mr. Burns in the case of an employe suffering from a leg broken in two places. This was set by the trained attendant and the man was able to walk to the hospital. An X-ray examination showed the fracture to have been perfectly joined.

FIRST AID ATTENDANT CLASS AT UTICA, N. Y.

The work of the American Compensation Insurance Company shows that the attendants may be entrusted with more elaborate work than has generally been the practice, and the equipment which this company advises as desirable for a first aid room is consequently as complete as the similar equipment in many hospitals.

FIRST AID EQUIPMENT

Their list of materials is as follows:

Bandages, etc.: Absorbent cotton, Bellevien gauze, 1" bandage, 1½" bandage, 2" bandage, 2½" bandage, 3" bandage, 3½" bandage, 4" bandage, ½" Z. and O. adhesive tape, 1" Z. and O. adhesive tape.

Medicines: Iodine and Gasoline, 50 per cent. solution; Tinc. Iodine, Tr. Iodine and Alcohol, 50 per cent. solution; Bismuth Formic Iodide Powder; Comp. Boro Zinc Cerate; Scarlet Red Ointment; Cocaine Eye Solution, 40 per cent.; 15-Grain Tubes, Sulphate of Zinc; Tinc. Green Soap; Eye wash, spec. formula; Aromatic Spirits of Ammonia; Balsam of Peru and Castor Oil, 25 per cent.; Jamaica Ginger; Peppermint; Wintergreen; Bichloride of Mercury Tablets; Carron Oil; Sweet Oil; Brandy; Bicarbonate of Soda; Witchhazel and Arnica Solution, 50 per cent.; Liquor Cresol Comp.; Grain Alcohol; Carbolic Acid, 95 per cent.; Peroxide of Hydrogen; Clinton Surgical Dressing.

Instruments: 1 Tourniquet; 2 pr. Crutches; 1 Gas Plate; 1 Combination Operating Table and Dressing Chair; 1 Sanitary Receptacle; Eye Droppers; 1 Spatula; 1 Razor; 3 Artery Forceps; 2 Scalpels; 1 Eye Spud and Lancet; 1 Speculum, eye; 1 Binocular Loupe; 1 Doz. Spin Clamps; 1 Splinter Forceps; 2 Dressing Forceps; 2 Scissors; 1 Stretcher; 1 Sterilizer and Burner; 1 Iron Table; 1 Dressing Stool; 2 Large Glass Jars (for cotton and gauze); 1 Hot Water Bottle; Salve Tins; Small Vials; Wooden Tongue Blades; Wooden Applicators; Scrubbing Brush; Measuring Glass; 1 Stirring Spoon; 1 Pus Basin; 3 Solution Basins; 1 Magnifying Glass; Rubber Sheeting; Blankets; 2 Probes; Splints 4" wide and ⅜" thick, in pairs from 12" to 47" long.

Approximate cost of building a first aid room is estimated at from $50 to $325, fully equipped; the instruments alone should not exceed $40 in cost. The New York Mills has installed three of these rooms.

FIRST AID OUTSIDE OF NEW YORK

Mills outside of New York State are taking up the matter of first aid service, partly as a part of general welfare campaign and partly because of the various legislative enactments, fastening absolute responsibility on the employer, manufacturers are considering it advisable not only to take elaborate preventive measures, but also to provide the best possible means of taking care of the injured when accidents do occur. Often a few minutes may mean life or death, and the sooner intelligent relief is given, the less serious will be the result. Many manufacturers have their private shop hospitals attended by doctors and nurses and find that such an institution is a distinct aid to the efficiency of their workers from which actual benefits are derived far in excess of the maintenance cost. Doctors and nurses for this purpose are in attendance part or all the time as conditions may require. In some plants the doctor or nurse not only gives relief in case of accident but also makes sick calls at the homes of employes. This latter activity among the employes' homes opens up a wide field of welfare work, the results of which cannot but help to aid the efficiency of the workers themselves, and at the same time create a better feeling towards the employer. With the services of a medical department, efficiently equipped the manufacturer is not only able to give relief to the injured, and insure himself of the least serious results—not only able to create a well-founded feeling of goodwill among his workers towards his organization, but he is also able practically to eliminate all inefficiency among his workers due to disease by a periodical medical examination of his employes and a rigid examination of all new workers. *American Industries* says in a pamphlet on this subject that "Several instances have been known of a claim being instituted for an injury which upon investigation proved that the injury was sustained while being employed elsewhere. Physical examin-

(*Continued on page 221*)

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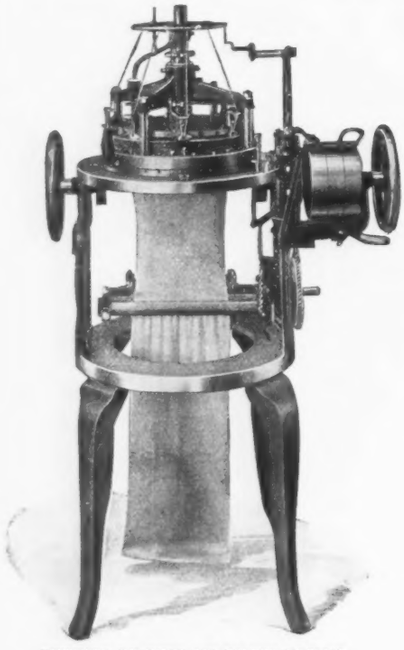

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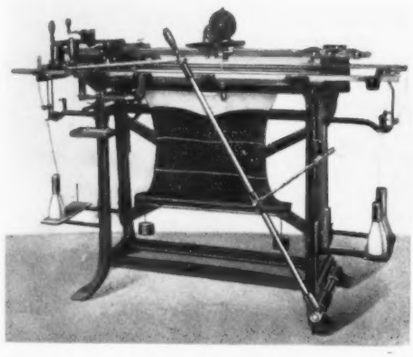

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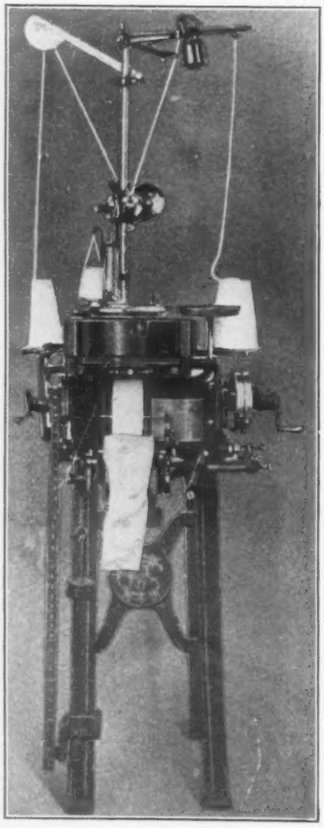

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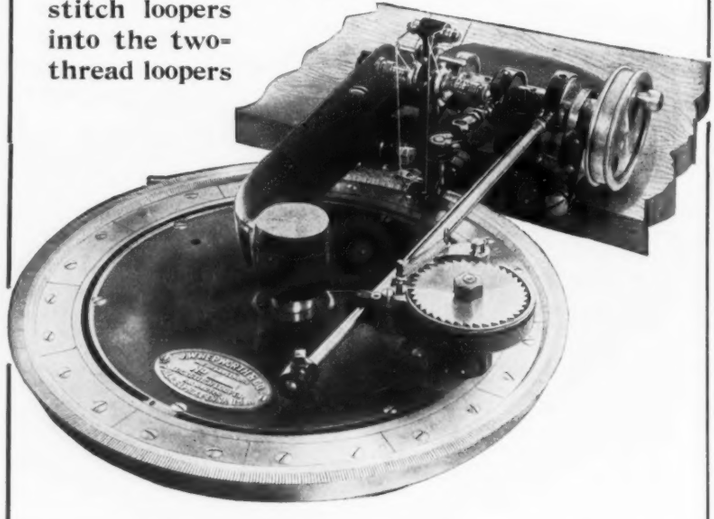

Technical Section

Unsolved Problem in Loop-Wheel Knitting

By Ernest Tompkins, M. E.

THIS title should be limited to knitting machines in which the cloth travels upward from the needles. It is a curious fact that in the original circular knitting machine the cloth traveled downward, then in the succeeding types horizontally, and finally vertically, and generally upward, as is the case at present with practically all American spring needle machines. The causes which led to this reversal of motion are even more interesting than the reversal itself, but the point to be emphasized here is that the present condition is the result of evolution—really revolution—so that logically it is advisable to make that condition as satisfactory as possible rather than to speculate on running the cloth downward again as at first.

The unsolved problem is that of getting a square ended roll when the cloth travels upward. The simple reversal to the original direction of motion seems to allow many solutions, since latch-needle knitting machines, which are adapted to the underswung take-up, make square-ended rolls. But so far the efforts to duplicate in the overhead take-up the action of the underswung take-up have not been successful.

The knitter and the knitting machine manufacturer are somewhat prone to consider that their industry calls for a rather high degree of ingenuity. If

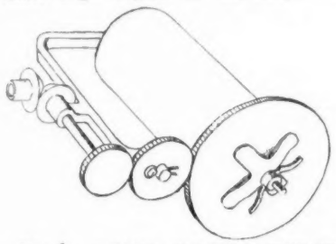

FIG. 1. TYPICAL OLD-STYLE TAKE-UP DRIVE; THE FABRIC TENSION VARIES INVERSELY AS THE DIAMETER OF THE CLOTH ROLL

they did not come to this conclusion of their own accord, the exclamation of the uninitiated, "What a marvelous machine!" would prompt it from without. Yet in spite of the fact that the circular machine is one hundred years old and take-ups seventy years old, and that the latter is the most evident part of the machine, swinging in full view year in and year out—in spite of all this, it has baffled that ingenuity, whether its degree is really high or low.

DIFFICULTIES TO BE OVERCOME

The difficulties to be met may be shown by a brief consideration of the conditions. Of course, it is advisable to roll the fabric in an overhead take-up, since the other alternative of pushing the cloth into a can is impractical for many reasons, among which may be mentioned the crumpling which would follow from pushing it up from the under side, the lack of balance which would result from the uncertain distribution of the load, and the inconvenience of taking down a snarled string of cloth weighing about forty pounds from the height of a man's head, and between take-ups swinging in close proximity. It would seem within the possibilities to lay the cloth so that these objections would be overcome, but there has been exerted but little if any effort to do so. Consequently, the development of the overhead take-up has been along the one line of rolling the cloth.

Among the requirements are the following: The ends of the roll should be plane instead of conical. Or, in popular language, the roll should be square-ended instead of bulged or hollowed.

The tension at the needles should be constant.

The roll should be centrally located so that the take-up will balance without the use of counter weights, and change in the size of the roll should not change the balance of the take-up.

The take-up should not need adjustment for change either in size of roll, speed of machine, or number of feeds.

The tube of fabric should feed at the same rate all the way around.

The roll should be readily removable from the take-up.

The shaft which forms the core of the cloth roll should be readily removable.

There should be facilities to slacken the cloth in order to hook on a press off.

There should be the general characteristics of a rapidly revolving piece of textile machinery—lightness without danger of breaking, good lubrication without scattering the lubricant, adjustments accessible without climbing.

EARLY FORM OF TAKE-UP

Fig. 1 shows a common form of early take-up. The bevel pinion at the top of the illustration was stationary, so that the revolution of the take-up turned the top shaft, which through the intermediate gear turned the large geared disc. Pressing against this disc was a star shaped flat spring which was fast on the end of the cloth roll shaft, and which was pressed against the disc with pressure which could be adjusted by turning the capstan nut at the end of the shaft. If the adjustment was right, the gearing would revolve the roll until the tension on the needles was just right, after which the star plate would slip over the smooth face of the disc until the fabric slackened when it would again roll and then slip, and so on. Evidently, this take-up met but few of the conditions just enumerated.

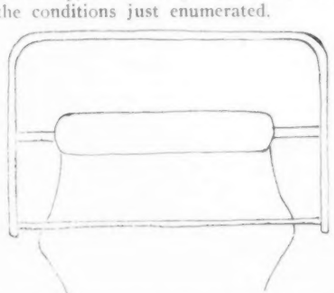

FIG. 2. EFFECT OF DRIVING CENTER ROLL; THE CLOTH WOUND FIRST IS NARROWED, SO THAT THE ENDS OF THE CLOTH ROLL FINALLY BECOME CONCAVED

The cumbersome gearing threw it out of balance unless heavily counterbalanced, in which case the increased weight necessitated stronger supports, and increased the difficulty of stopping the machine quickly.

The friction was not dependable, since changes in temperature, in the lubricant, and in the amount of lubricant, changed the force transmitted.

Some of the other shortcomings may be understood from Fig. 2 which shows the method of rolling. The cloth was wound on the central axle, which made a variable pull on the needles unless the friction was frequently adjusted during the formation of the roll. If the take-up was not so adjusted and the roll varied in diameter from 2 inches to 20 inches, then the pull on the needles varied from 1 to 10, an insufferable amount of variation, except with very coarse gauges, and even then highly undesirable. Moreover, the roll would be concaved, since the severe tension at starting would narrow the cloth. Of course, the succeeding layers would tend to press the center out again, but seldom entirely counteracted the initial narrowing.

Finally, the cloth roll could not be taken out as such, but the friction had to be released and the string of fabric had to be pulled off on the floor or into a box, all of which wasted the time of the machine and the operator, as well as making the fabric inconvenient to handle.

It would take a book to hold even a brief historical review of the changes which have been made in this old take-

(*Continued on page 215*)

Systematic Examination and Testing of Raw Silk

By K. B. Lamb, Ch. E.

THE examination of raw silk is a difficult problem and everything of possible value should be considered in attacking that problem. It is the purpose of this article to describe the procedure, methods, and tests which, in the writer's opinion, can advantageously be used for raw silk examination, and by means of which the value and quality of the raw silk can be judged.

The first methods used for the examination of raw silk were of the inspection type only. In other words the qualities upon which the silk was judged were only those which could be determined by sight and touch. While useful in itself and still a necessary part of a complete examination, this kind of an examination has many insurmountable disadvantages, and really only touches the surface of what should and can be done to determine raw silk values.

In the first place great skill and experience are required to make an inspection, and qualities are judged and decided upon entirely by the inspectors' personal opinion. As personalities differ, it is bound to follow that the results obtained will differ. The visual differences between the grades of raw silk in close proximity to each other in the scale of qualities are so small that no group of inspectors, no matter how expert and experienced they may be, will agree in all their classifications on the same samples of silk. And yet when the prices of the different grades and their workability are considered the accuracy of classification becomes a vital question. All silk manufacturers know that the way a silk shows up "in work" often fails to substantiate the claim of the grade delivered, and that if inspections are made both here and abroad they seldom agree.

PRESENT METHODS OF TESTING

The inspection test is very valuable to determine quickly some qualities (qualities that cannot be determined in any other way), and it should be a regular part of any complete examination. But there are many very vital properties which must be determined which are entirely beyond the possibilities of personal inspection, and it follows that other tests are most necessary and really compose by far the most important side of the examination. Present methods are therefore based on physical tests as well as inspection tests.

While these present methods are a great advancement over those first used there is still much to be done in systematizing and in working out new and quicker tests. One method which has received very little attention, but which is most valuable in connection with other tests, is microscopical examination. The miscroscope offers a very quick means of visually examining the silk fiber for defects which it is impossible to see with the naked eye or to determine by any other means. In addition it can be used for examination after boil off and dyeing, and throughout the entire process of manufacture. It is one of the most valuable instruments for the examination of silk, and such examination will be considered in more detail at the end of this article.

REQUIREMENTS OF TESTS

In devising and using tests certain points should always be kept in view. The first of these is quickness in obtaining results. The test should be one that can be made quickly and the results obtained in usable form without delay. Most manufacturers are in a hurry for their silk to be "put to work," and quite rightly so. When a valuable material, such as silk, lies idle, the interest upon the money invested becomes quite an item.

Hand-in-hand with speed in obtaining results must go accuracy. The values obtained must be accurate and expressed in definite units which can be properly interpreted. The tests should be such as can always be made under uniform conditions, and can therefore be directly compared with former tests. This is very important as many tests are valueless unless the results can be compared with results obtained upon former lots of silk, the quality of which is known as proved during their processing.

In fact the tests should all tend to show how the silk is going to work; *i. e.*, if it can be economically used to give a satisfactory final product. For instance, they should show whether the silk will wind well, can be thrown with minimum waste, will dye well, etc.; and, finally and most important, if it will weave well. That silk which gives the highest loom speed is usually the best and most economical to use, because any stoppage of the loom means a loss in time and an increase in expense far greater, for instance, than a break in winding or even in warping. Tests are most valuable, then, when they foretell the efficiency of production and the quality of product. These in turn determine to a large extent the price that can be *paid* for the raw silk, and the price that can be *obtained* for the fabric manufactured.

IMPORTANCE OF PROPER SAMPLING

Sampling is a vital question and its importance is very often overlooked. It is very easy to lay great stress on small incidentals of testing without remembering that a much larger error than that introduced by the test itself may enter through improper sampling of the raw silk. A simile is the man who car-

ries the calculations of an analysis out to the second decimal place when his analysis itself may hardly be accurate to the first decimal place. This is a very common failing in all classes of work. Sampling should therefore be carefully considered and made absolutely as representative as possible. Methods of sampling will be considered in more detail under their various subdivisions.

METHODS OF EXAMINATION

In the examination of raw silk the tests naturaly divide themselves into three classes: (1) Inspection tests; individual decision by means of sight, touch and experience. (2) Physical tests; made with mechanical apparatus. (3) Microscopical tests; made with the microscope and photomicrography.

QUALITIES DETERMINED BY INSPECTION

As an inspection is based almost entirely on personal judgment and sensibility, there is not quite as much to be said about it as about other tests. Those qualities which can be determined by inspection follow:

(1) Examination of the silk itself—
- (a) Color.
- (b) Cleanliness.
- (c) Luster.
- (d) "Feel" (nerve).
- (e) Gum, hard or soft.
- (f) Uniformity (by this is not meant uniformity of size, but, for any particular lot, uniformity in all the qualities listed in 1, 2 and 3).

(2) Examination of the skeins—
- (a) General character of skeins.
- (b) Diameter (standard or not).
- (c) Crossings.
- (d) Lacings.

(3) Examination for defects.
- (a) Knots.
- (b) Loops.
- (c) Nibs and slugs.
- (d) Split ends.
- (e) Fine ends.
- (f) Coarse ends.
- (g) Double ends.
- (h) Corkscrews.
- (i) General smoothness of fiber, etc.

CONDITION OF GUM IS IMPORTANT

The silk should be carefully examined for the qualities listed in Division 1. After color, cleanliness and luster are determined, the gum should be carefully examined. The condition of the gum is important, because hard-natured silks are applicable for certain classes of material which soft-natured silks are not, and vice versa. This is determined more or less by the "feel" and stiffness of the silk. The uniformity of the silk under consideration should be good; that is, all samples of the lot examined should be of the same average cleanliness, color, etc. Lack of uniformity causes all kinds of trouble, as the treatment of different grades and classes of silk necessarily varies. Therefore, if the silks are mixed, the results will also vary, and loss of temper, time, and money result. This lack of uniformity is a great fault of Asiatic silks.

EXAMINATION OF SKEINS

The skeins should be examined first for general appearance, and should all be of the same size, and preferably of a standard size and weight. This is, of course, usually true for any one lot. The best crossings are of a definite diamond shape. This greatly increases the ease and speed of winding, and minimizes the breaks. Where the crossings are small and close the silk fibers are more apt to catch or "settle" together, and are therefore much harder to unwind. Lacings should be loose and preferably interlaced through the silk. They should be of light cotton which can be broken easily by the hand. This type of lacing does not have to be cut with scissors, as some of the stronger lacings do, and there is therefore no waste made by accidentally cutting into the silk. The interlaced lacing also does not snarl or become tangled in the silk after soaking, as do the lacings which are tied tightly around the skeins.

This latter type of lacing is found in Cantons. In addition, it contains a high twist, which kinks the lacing when it becomes wet, often causing it to become seriously entangled with the silk. All knots should be small, with no long loose ends.

BOARD EXAMINATION OF FIBER

In looking for defects in the fiber an examination board termed a "mirror" should be used. This is made of black cardboard, about 6 by 11 or 3 by 6 inches in size, about which the single strand of raw silk is uniformly wound by a screw-feed winding machine especially designed for the purpose. In this manner a considerable length of fiber can be examined in a compact way, while the black background emphasizes any defects which may be present. Particular attention should be given to knots, loops, nibs, split ends (*i.e.*, all the defects listed in 3). In poorly reeled silks, knots and loops are frequent. The cocoon is spun by the worm in moving its head in a figure eight motion, and the silk lies on the cocoon in this form. If the temperature of the water in which the cocoons are softened and reeled is not right, these loops will often pass right up through the eye with the other cocoon strands and become partially cemented to them. Sometimes they will be entirely cemented to the raw thread and escape notice, but they then develop when the silk is boiled off. They, of course, decrease the strength of the fiber, as well as causing a break in the smoothness. Nibs, split ends, etc., are also caused by poor reeling, and must be carefully looked for.

This examination is very important, as the defects here found are of the type which cause much trouble in weaving and the general appearance of the finished product. This board examination should be made on a boiled off sample as well as on the raw thread.

PHYSICAL TESTS

Sampling is particularly important in making the physical tests, and as representative a sample as is practicable must be chosen.

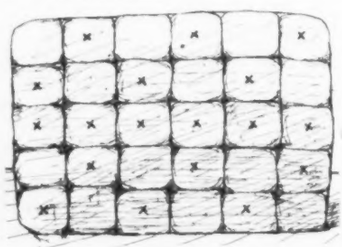

FIG. 1

Figure 1 shows the method of sampling a 30-book bale of Japan for the conditioning test where 18 skeins are needed. The diagram shows the bale with the cover and shirt removed, and the crosses show those books from which the skeins are drawn. As will be noticed, the samples come from all parts of the bale and are evenly distributed.

TEST FOR MOISTURE

The moisture test is a test of the moisture condition of the silk, not of the quality, and is used when determining the conditioned weight of silk in a shipment. The procedure of the Conditioning House is to draw 18 skeins from different books in the bale and to weigh them immediately in three sets of six skeins each. Two sets are then independently dried and the results calculated. The third set is only used if the first two do not agree within a reasonable limit. Of course, the greater the number of bales sampled the greater the accuracy of the test will be. Two out of five is usually sufficient, particularly as the bales of one lot of silk are usually stored together, and are therefore of approximately of the same moisture content.

The test is made by placing the skeins in a conditioning oven, where air heated above the boiling point of water is blown up through the silk until it is perfectly dry. The weighings are made directly in the oven on specially designed balances, and the dry weight taken when the silk does not lose further in weight. "Conditioned weight" is the absolute dry weight plus 11 per cent., which is the standard moisture content for silk as adopted throughout the world.

TESTS FOR BOIL OFF

The boil off test is very important for both raw and thrown silk. This is evident when we realize that in Japanese silks the percentage of gum varies from 16 to 24 per cent., Italian 19 to 25 per cent., China 16 to 23 per cent., Canton 18 to 24 per cent., Tussah 9 to 27 per cent, etc., and that it is only the boiled off silk that can be used. Excess gum is pure waste, and rather expensive waste when we consider the price of raw silk. If the throwing is done outside the mill, the percentage of gum must be known before sending the silk to the throwster, and also the percentage of gum, soap, and oil after receiving it back from him. Only thus can the percentage of waste be ascertained and the amount of useful silk be known.

Ten skeins are drawn from each bale from different books. A small portion is then parted from each skein, and these portions combined into a skein of about 100 grams. This test skein is then conditioned to get the dry weight. It is then boiled off in two successive soap solutions for one half-hour in each. These solutions contain soap to the amount of 25 per cent. of the weight of the silk. It is thoroughly washed, the dry weight again determined, and the percentage loss calculated.

SIZING TESTS

We now come to the tests which are probably the most important and useful. These are the sizing tests, which establish the average size of the raw silk and its uniformity. The main object of the raw silk reeler is to obtain a uniform silk, and it is the degree of uniformity which largely determines the quality of the silk. Sizing tests are therefore very important, and, at the same time, are accurately and easily carried out on standard machines in a short space of time.

Briefly, the principle of sizing is to determine the weight per given length under standard conditions. It is advisable to sample every bale of the lot, because of the possible variations in size. In questions of controversy the Silk Association of America makes the provision that as many as five sizings may be made on each bale, thus recognizing the variable nature of this quality of the silk.

In the Conditioning House ten skeins are selected from each bale. Part of each skein is wound onto spools and 30 test skeins of 450 metres each are then reeled off by an automatic reel. To bring them to standard moisture content they are then put into a room where the atmosphere is of the standard humidity, left until they absorb the standard amount of moisture, and then weighed together as well as each one separately.

The average size is obtained by dividing the total weight by 30, and the size of each skein, weighed in deniers (.05 gram), is also obtained from the individual weights directly. (The "size" is the weight of a 450 meter skein in deniers = .05 grain).

The "conditioned sizing" is made in the same way as the regular sizing, except that after weighing each separate test skein, they are all placed in a conditioning oven, dried to absolute dryness, weighed while dry, and to this dry weight the standard regain, 11 per cent., is added. The total conditioned weight is divided by the number of skeins and reported as "average size on conditioned weight." When it is desired to obtain an average size over a larger amount of silk than is contained in a "regular sizing" a "compound sizing" is made. This consists in drawing 20 skeins from which 20 test skeins of 4500 meters are reeled. Small variations in the fineness of the silk are not so apparent as in the "regular sizing."

The regular test is valuable for quality as it shows the variation of the silk, i.e., the maximum of unevenness of the highest and lowest sizing skeins. But as a bale of silk contains from 30 to 45 million yards and the regular test only turns out approximately fifteen thousand yards, a "compound sizing" test is often made, taking one hundred thousand yards, from twenty original skeins of the bale, to get more closely the average size of the whole bale. The compound test is valuable for the average size and as a basis to pay for throwing; also a test to know the yards of goods a given number of pounds conditioned weight raw should make. The conditioned sizing is the most accurate test because it is based on the dry weight and is therefore independent of the amount of moisture in either the air or the silk.

It is often advisable when the unevenness is great to make tests on shorter skeins say of 100 meters each. The shorter the skein the easier it is to check the maximum and minimum size. Tests on small skeins are desirable for the reason that as a chain is only as strong as its weakest link, raw silk is only as strong as its weakest spot. However, very small skeins cannot be used because of the errors of weighing and conditioning which become multiplied with small weights.

The question of accurate sampling is a vital one for these sizing tests. In raw silk, as has been said, the size varies considerably in each bale, yet it is impracticable to take the number of samples that are really desirable for an accurate result. The best that can be done is to use as many as is practicable and never to base a calculation or to draw any conclusions from sizings made on an insufficient number of samples.

TENACITY AND ELASTICITY

The test for tenacity and elasticity also shows the quality of the raw fiber. It is made by breaking one half meter of a single raw silk thread in a machine especially designed for the test. Fifty centimeters of the raw thread are clamped in the machine. The lower clamp is released and falls uniformly until the sample breaks. The breaking strength is read directly in grams and at the same time the elasticity, which is the stretch of the fiber up to the breaking point, is recorded in millimeters per meter. As there are 1000 m.m. per meter the result divided by 10 gives the percentage elasticity directly. At least ten determinations should be taken for each test and the individual and average results should be used in judging the quality. This is shown by the de-

gree and uniformity of the strength and elasticity. The tests should be made in a room of standard atmospheric condition (65° — 70° relative humidity and 70° F.) As a basis of comparison the average tenacity per denier can be obtained by dividing the average tenacity by the average size,

$$\text{i.e.} \frac{T}{S} = ?$$

WINDING TESTS

As the cost of throwing and percentage of necessary waste is largely determined by the way the raw silk will wind, winding tests should be made. These should show the number of ends an operative can keep going and the number of breaks which occur in a given length and time. If a silk winds well it usually weaves well also, but if it winds poorly and numerous breaks occur it is almost sure to give trouble on the loom.

The test is made by winding 10 skeins, dry, at an average speed of 75 yards

FIG. 2

per minute. The number of ends an operative can keep up and the number of breaks per 300,000 yards are recorded. The total time is also taken and from this and the number of yards wound is calculated the number of yards that can be wound per minute, and the number of breaks per hour. Modern manufacturers are speeding up their machinery and nowadays silk must stand the increased speed necessary for efficient work. It is therefore sometimes advisable to make a test at say 150 yards per minute winding speed instead of 75.

MICROSCOPICAL TESTS

The microscopical examination of silk is a subject that has never been really considered in a commercial light. There are few men engaged in the manufacture of silk who know anything about this subject, and it is therefore natural that the other tests should have been worked out in detail and the microscopical methods more or less overlooked. In fact, until now very little research work has been done, and practically nothing toward developing quick systematic methods. While the microscope has its limitations, and can never, of course, take the place of some of the other tests described, it is invaluable for determining certain elements of quality and should be regularly used in determining raw silk values.

The sampling should be thorough; that is, a small piece should be taken for examination from as many skeins as is practicable. If the microscopical tests are run at the same time as the other tests described a bit of each skein used in all other tests can be examined. The apparatus necessary consists first of a good compound microscope. The writer uses a microscope with three objectives and three eye pieces which can be interchanged and will give in different combinations magnifications from 50 diameters to 560 diameters. Of course the regular magnifications are seldom used except in cross section work, the usual magnification used being from 75 to 150 diameters.

In preference to the clips for holding the glass slides between which the silk is placed, a movable stage should be used. This allows the operator to move the slide along beneath the lenses so that he can quickly examine the whole length of fiber on the slide. There is not space here to describe in detail the methods of operation, but briefly they consist in placing the silk to be examined between two glass microscope slides which are clamped in the microscope. Several fibers can be examined side by side to save time and an experienced operator can examine each slide in a few seconds.

Another, and perhaps better, but more expensive way is to use the photomicrograph. This, besides being useful for taking photomicrographs of the silk and of its defects, can be used as a lantern to throw the image of the silk fiber directly on a screen. It is here very greatly magnified, can be examined easily, and moved across the field of vision by means of the movable stage before mentioned.

In this apparatus the microscope is clamped directly in the machine and a powerful arc light focussed upon the sample. This projects the image upon the screen, which is placed before and about six or eight feet in front of the microscope. At the laboratory of the U. S. Conditioning & Testing Co. the writer has a small dark room especially fitted up for this type of examination.

Those qualities for which this examination is particularly valuable are as follows:

(1) "Lousiness."
(2) General condition of the fiber.
  (a) Cohesion, openness.
  (b) Examination of the gum.
  (c) Cleanliness.
  (d) Evenness, smoothness.
  (e) Knots, loops, nibs, split ends, etc. (i.e., those defects listed under "Inspection Test" three.)
(3) Examination after boil off.

The subject of "lousiness" will not be taken up in detail as, being an important and special subject, it would take up too much space. It will suffice to say that "lousiness" can be usually detected by microscopial means before the silk is used, thus saving much time, trouble, and money. This was formerly

FIG. 3

thought an impossibility.. Figure 2 is a photomicrograph of "lousy" silk.

FIBER DEFECTS FOUND WITH MICROSCOPE

It is easy to judge the general condition of the fiber by examination through the microscope, and defects can be found by this means which escape visual inspection. The degree of cohesion of the different strands of the raw thread can be seen and therefore subsequent "flossiness" or "openness" foretold. This defect is sometimes confused with "lousiness." Figure 3 is a photomicrograph of a poorly cemented spot of a raw silk thread. It is evident

FIG. 4

that it will open up upon boil off. When the individual cocoon threads separate off from the main thread we get a "flossy" or "fluffy" silk. This is what happens if the raw thread contains many such spots as illustrated. Figure 4, on the other hand, illustrates a well cemented fiber, and the difference is obvious.

The condition of the gum can be determined i.e. if it is smooth and completely covers the fiber or if it is "flaky" and chipped off leaving the fibroin exposed. In a similar way the cleanliness and evenness of reeling can be judged. Knots, loops, nibs, slugs, corkscrews, split ends, fine ends, coarse ends, double ends, etc., are all defects which can be examined directly in a magnified condition. Many defects are caught by the microscope which in an inspection test escape the eye, but which develop later after boil off and dyeing and cause much trouble. In fact, it is usually desirable in examining raw silk to boil off small portions for the different periods of time and then again to examine the threads with the microscope for defects which may have developed.

While this article is devoted to the examination of raw silk it might be mentioned that the microscope is often very valuable for further examination after throwing, boil off, weighting, dyeing, and weaving. For all microscopic work the examiner must have both skill and experience.

It is hoped that the foregoing article will give the reader an idea of the tests that can be made for judging raw silk qualities, and that it will strengthen the conviction already established in the minds of the more progressive silk manufacturers that systematic examination of raw silk is a necessary operation for any efficient and progressive concern.

LOOP WHEEL KNITTING

(*Continued from page 209*)

up. Apparently, each variation has some of the endurance of its prototype, for the original and many of its variations are still manufactured to some extent. But the object of this review is not so much to record what has been done, as to show what may be done in the line of improvement. The need of such a review is abundantly witnessed by the reappearance of old take-ups, owing to lack of knowledge that they were old or owing to an insufficient understanding of the requirements. Overswung take-ups have been constructed which are alleged to have made square-ended rolls, but they were so cumbersome and inconvienient that no one would use them, except possiby the inventor.

Although the take-up shown in Fig. 1 was refined by the use of worm gearing, which reduced the weight: by removable shafts, which enabled taking out the roll intact; by refined frictions, which made the operation more dependable, etc., still two marked changes were required to make the generally accepted take-up of to-day.

UNDER-DRIVEN CLOTH ROLL

The under-driven cloth roll is one of these changes. It is shown in Fig. 3. The power is applied to the lower rolls so that the cloth roll rises as it fills. When it is as large as desired, it is lifted upward to release the core from the guides, the fabric is cut above the driven rollers, and the cloth roll is taken down and the core is pulled out of the cloth roll and replaced in the take-up guides so that another cloth roll can be built up on it. The end of cloth is drawn narrow, and started around the core, after which the turning of the lower rolls continues the building of the new cloth roll. The convenience of this method is evident. Also, the needle tension is not slackened, and slight force is required for the rolling, since it is applied to the circumference of the roll instead of to the center. But the ends of this roll are bulged instead of concaved. Among the reasons for

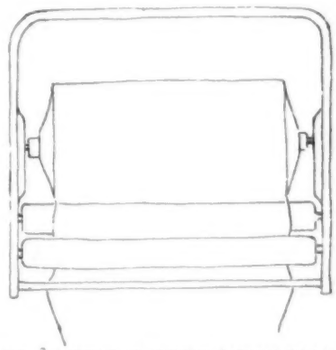

FIG. 3—EFFECT OF DRIVING BOTTOM ROLLS; THE CLOTH ROLL SPREADS AT THE CENTERS

this are the pressure of the outer layers on the inner ones, and the smoothness of the core required for its withdrawal.

RATCHET FEED

But one of the important causes of the bulging of the ends of the roll is the other improvement over the old take-up—that is, the ratchet feed, which has almost entirely displaced the friction feed. Fig. 4 shows a typical ratchet feed applied to the under-driven cloth roll. The crank disc at the top is revolved continuously by the turning of the take-up, just as the pinion shaft is in Fig. 1. The parallel rods are so connected that too strong a pull will compress the spring instead of moving the pawl. Consequently, when the fabric tension holds back the feeding rolls, the crank motion is entirely expended in compressing the spring; but as the fabric tension is slackened by the production at the needles, the pull of the spring overcomes the tension and the

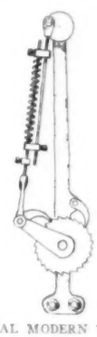

FIG. 4—TYPICAL MODERN TAKE-UP DRIVE

take-up begins to take, and continues to do so until the fabric tension again stops it.

Theoretically, the pawl is supposed to feed at each up stroke and this would be the case in the take-up illustrated if the teeth were infinitely fine; but such teeth would not be durable. Two interesting means of meeting this diffi-

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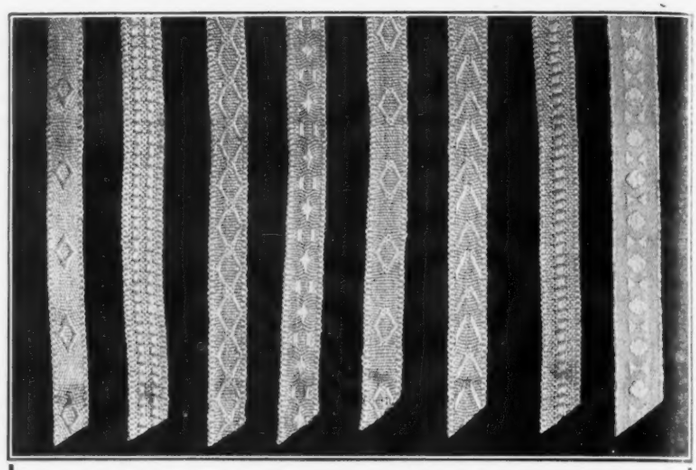

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culty are worthy of mention. One is to use a fine tooth ratchet for the stationary pawl (on which there is the least wear) so that even if the moving pawl pushes the roll only half a tooth, the stationary pawl will catch it, so that it can not slide back. The other method is to use more than one stationary pawl, so placed that one holds a tooth when the other does not. If three stationary pawls are used, they may be so placed that the ratchet will be kept from turning back when it is moved forward only one-third of a tooth.

The importance of these methods will be understood more fully when it is realized that the prevalent form of ratchet take-up is a device which kicks the cloth around. Not only that, but it allows it to slide back some distance before it kicks it again. Consequently, the severity of the kick is reduced by reducing the slide back.

RATCHET DEVICE NOT IDEAL .

But even with the reduction of the slide back already mentioned, the present ratchet device is far from ideal, as may be seen when it is at its worst, which is at high speed with loose thick fabric such as fleece goods, in which case the ends of the roll bulge so that they sometimes have to be tied-in soon after the roll is started, or started with a compression roller on top made of shafting, which roller is removed when the roll is partially filled.

If the machine is turning at the rate of 70 revolutions per minute and the take-up is geared two-to-one, the crank shaft makes 140 revolutions per minute, and the pawl makes 280 strokes, so the duration of each stroke in seconds is 60 divided by 280, or about one-fifth of a second. Now it takes quite a kick to move a roll averaging 20 pounds in weight in one-fifth of a second. Of course, there will be some lag; that is, the spring will utilize its springiness to take a little longer time; but that in turn reduces the travel of the pawl, for then the crank will be on the return trip.. Consequently, the spring must be adjusted tighter to compensate for the lag.

TENSION ON NEEDLES

Regarding the variation of tension on the needles with size of cloth roll, although this is nowhere near as much as with the friction and central driving shaft, still as the roll fills it increases the load on the spring, both owing to its weight and to its inertia, so for fine work even the most improved take-ups are still deficient in this respect.

A favorite means of trying to overcome the bulging of the ends of the roll as well as of keeping the tension on the needles uniform, is to drive the cloth roll centrally and independently of the rollers which draw the cloth from the needles. But there are three prominent obstacles in the way of doing this. One is the difficulty of releasing these devices quickly when it is desired to slacken down the cloth. Another is the difficulty of varying the cloth roll pull at the center according to what is required at the circumference. And the third is the difficulty of keeping the cloth-roll pull from transmitting through to the pull on the needles and disturbing it.

Many other schemes have been tried, but in their development, the complication, the weight, and the cost increased, and the inventor's means and perseverance decreased, so that all practical benefit thereof is lost, and the potential value consisting of the knowledge gained is disappearing with those who have it.

But past failures leave present opportunities. There are lots of intelligent men who as they look for some means of advancement see the take-up swinging before them. Possibly by looking at it, instead of beyond it, some lucky one may conceive of a means of rolling the cloth with uniform tension on the needles, with practically constant motion, and without distorting the ends of the roll.

Some Aspects of Commission Business

By G. D. Crain, Jr.

NO manufacturer in the textile or any other industry can afford to get along without a well-developed cost system, which he can depend upon, and which will keep him posted right along as to the expenses of production. That belongs in the a, b, c of manufacturing, though at the same time it is a rule that is often broken.

If there is one member of the trade more than any one else, however, who must be "on the job" as to costs, and who stands to lose heavily if he errs in this respect, it is the man who is handling commission work. The custom manufacturer, who takes material belonging to the buyer and carries it to the finished state, getting a return which represents simply the cost of manufacturing, has no opportunity to cover up errors in figuring by an extra margin secured through clever buying of material, liberal allowance for overhead, etc. He is down to bed-rock, and his proposition is shorn of everything but the essentials. His money must be made purely by making the goods right and figuring the cost right.

CUSTOM WORK OF PRESENT IMPORTANCE.

Just now, with woolen mills and plants in other departments of the field busy with unusually heavy orders, the commission phase of the trade is getting more attention than usual. Numerous plants with large contracts to fill—some of them with time limits—are looking about for opportunities to sublet part of the business, and in many cases this takes the form of furnishing the material and having the manufacturing done on a custom basis. The concern which is able to handle this business to advantage profits, inasmuch as it can fill up slack periods in its own schedule of operations; but it must know "where it is at" as to costs if it is to get anything out of the business.

The average buyer of textile products does not understand the details of manufacture as well as the man who makes the goods. This is not always true, of course, for some of the big mail-order and department store buyers have gone into such questions so thoroughly that they know to the fraction of a cent how much a pound it costs to make the goods they want, so that it is impossible to sell them anything at too long a margin. Taking it by and large, however, the maker has exclusive possession of the secrets of manufacturing costs when he approaches the buyer, and the latter is guided principally by a comparison of competitive quotations in determining whether or not the price is right.

ACCURATE FIGURING NECESSARY

It is different when the concern which does custom work enters the field. It is taking business from a manufacturer who is in the same line, and who, presumably, is successful; otherwise he would not be operating over-time, nor have so much business that part of it must be taken care of by equipment other than his own. This manufacturer necessarily knows what it is costing him to turn out goods, and when he gets a quotation from some other concern, indicating the basis on which it will supply him with material wholly or partly finished, he presumably knows what margin over bare cost of production this figure represents. In other words, the usual advantage of the seller is lost. If the custom manufacturer bids too low, his offer will be accepted without protest, of course; if too high, he will not get the business. It must be just right—that is, it must cover the cost of production and leave a reasonable margin of profit,—in order to be mutually satisfactory, and, as suggested, this absolutely requires that the bidder know his costs from one end of the mill to the other.

Another feature to be emphasized in this connection is the fact that the manufacturer who takes custom work involving the use of only one of his departments, or a portion of his equipment, must understand the cost of production for each set of his machines. If a woolen hosiery mill, for example, takes a contract to spin woolen yarn for another concern, it must know the cost of carding and spinning, as well as that of carding, spinning and knitting. This point is worth emphasizing because there are mills in the hosiery business, making a standard line of goods, which do no more cost accounting than is indicated by grouping the entire expenses of the plant, dividing by the total amount of production, and calling the result the cost of producing the unit upon which the calculation has been based. Where there is comparatively little variation in the product, this works out fairly well, but there are not many textile plants where such ideal conditions exist. In the mill where different grades and weights of hosiery are being made, with consequent variation in the cost of material and labor involved, such a method of finding costs appears crude and next to worthless. It would not be of much help in getting the correct amount to charge for the use of the carding and spinning equipment alone.

DISPOSAL OF OVERHEAD.

In determining how much custom work is worth, it should be remembered that the manufacturer is not justified in figuring in a number of items which are ordinarily charged against the product as overhead. Interest on the investment in material is eliminated; and interest is often one of the principal items of overhead expense. Shrinkage is another item that does not have to be taken care of; and if the business is handled on a cash, or practically cash basis, as is often done, the amount lost in discounts, which enters into the overhead apportionment, will have been saved. All of the other overhead items, such as office and executive expense, rent, power, light, taxes, insurance, depreciation and so on, are still working. This must be remembered, and emphasized, because the tendency has been observed in some cases where custom work has been figured, to estimate actual manufacturing costs as represented by labor and power, and then to add a much smaller proportion for overhead than is usually considered necessary. There may be some justification of a specious nature for this if the work is to be done on overtime, and handled as an extra proposition; but even then the only fair way to handle the business would be to make it bear its just proportion of those items of overhead expense which apply to all of the other work going through the plant.

AN INSTRUCTIVE STORY.

One of the interesting phases of custom work is that the man who is short of capital, can find thereby an opportunity to break into the field, when he would be unable to do so under other conditions. The writer recently had an opportunity to observe a case of this kind which was so typical in some respects as to suggest that it must have many counterparts elsewhere. A certain woolen spinning company had been in financial difficulties, and the mill had been closed down to await a sale of the equipment. The superintendent of another woolen plant, who had been looking for an opportunity to get into the business on his own account, heard of the plant being for sale, but having no capital, he saw no way of securing it for himself. He felt sure that he would have no difficulty doing business if he could once get possession of the equipment. He finally proposed to the trustees in charge that they lease the mill to him for twelve months, with the privilege of buying it outright at the expiration of that time. Since they had received no offers at figures which seemed to them up to what the plant was worth, and as any revenue would be a good deal better than nothing, they decided to accept his offer. Fortunately, the first month's rent was not demanded in advance.

The superintendent, who to the astonishment of his employer had resigned (for the head of the concern knew that his employe had little financial resource), then made arrangements with the electric light company to supply current for the operation of the motors, and thereby parted with most of his slim bank-roll in the form of a deposit. He next picked up several of the former employes of the mill, and arranged to start them at work on the following Monday. Having arranged for the actual operation of the plant, he jumped on a train and went to a neighboring city, where was located a big sweater factory, reputed to have large war orders to a volume greater than it could turn out in its own plant. He proposed to the head of this company that he furnish part of the yarn required, and after getting the manufacturer interested, explained that he would prefer to handle the business on a commission basis.

"If you will furnish the wool," he said, "I'll spin it up for you at 3c. a pound less than you can buy it on the open market, provided you'll let me ship the yarn sight draft attached to bill of lading, as I'm running pretty close to the wind."

The sweater concern figured on the proposition, and finding that it could not lose on this basis, entered into the deal, which is now in operation. It is shipping the wool needed, the spinner is turning out the yarn, and the latter is getting his money out of the product soon enough to take care of his payroll and other operating expenses.

CUSTOM WORKS ADVANTAGES.

In this case there is practically no overhead. The manufacturer has no office, he is his own superintendent, the rent and power are direct charges which he figures into the cost of production, and he has nothing to contend with in the form of insurance on material or equipment, depreciation, taxes, or anything of that sort. His is an unusual condition, and it is all the more interesting because of the fact that this man started in business with only a few hundred dollars, absolutely no credit, and without means to buy either machinery or material. He is now making money fast enough to justify him in predicting that he will be able to purchase the plant outright a little later. This is a case of working up from a "shoestring," and is also a suggestion of the possibilities of custom business from the standpoint of the concern which is hard pressed for working capital.

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"GIVE US A FLAT SEAM"

has been the continuous cry of the Knit Goods Trade for 25 years. This cry has remained unanswered until now

Today you can make a

Perfect Union of Abutted Cut Edges

forming a Strong, Soft and Smooth

FLAT SEAM

No Thicker than the Fabric Itself, in One Operation and at High Speed on our

"FLATLOCK" MACHINE

OVER 10,000,000
knitted garments chiefly Union Suits have already been FLATLOCK Seamed and sold to the trade.

Domestic and Foreign Patents on Both Machine and Seam

TRADE MARK REG. U. S. PAT. OFF.

BUSINESS ESTABLISHED IN 1859.

ADDRESS ALL LETTERS TO THE COMPANY.

WILLCOX & GIBBS SEWING MACHINE CO.

658 BROADWAY, COR. BOND STREET

TELEPHONE SPRING 6100

New York, January 1st 1916.

ANNOUNCEMENT

"FLATLOCK" MACHINE. SALE or RENT.

To the Knitted Underwear Trade:

To meet the divergent views of the Trade the Flatlock Machine is offered for sale, as well as for rent.

No manufacturer now need deny himself the use of this, our latest invention, which marks the most important stride in our successive advances in the improvement of seams for cut knit underwear.

As to its mechanical excellence, we leave this to the judgment of the Trade, whose experience through a long series of years with our other specialties is an earnest of what they may expect, and surely will find, in the Flatlock Machine.

Yours very truly,
Willcox & Gibbs S. M. Co.

Trade-Mark

Reg. U. S. Pat. Off.

Willcox & Gibbs Sewing Machine Co.

Chief Office, 658 Broadway, Cor. Bond St.
NEW YORK

Trade-Mark

Reg. U. S. Pat. Off.

probably it would be hard to find enough commission business under ordinary circumstances, to keep a mill going. Still, there are always some plants that are busy, even in dull times, and if the manufacturer who wants to handle work on the custom basis knows how to figure his costs, and is sure to protect himself at that point, he will be able to take the surplus business of other plants at a figure which will be not only fair to them but will also include a profit for himself.

FIRST AID IN MILLS

(*Continued from page 205*)

ation and proper recording would largely eliminate occurrences of this kind."

PURPOSE OF MEDICAL DEPARTMENT

It goes on to say that a medical department, to bring about the desired results, should take the following steps:

1st. Give immediate and effective relief and continued treatment to those incapacitated through injury.

2nd. Complete physical examination of all employes and new employes at time of employment.

3rd. Steps taken to rectify all existing defects found.

4th. Those having defects should be examined at regular intervals to ascertain if defects are showing improvements or becoming more aggravated.

Working along these lines, the following results should be obtained:

1st. Wounds properly and quickly treated, danger of infection reduced and recovery from injury hastened. Proper treatment also tends to encourage care of minor wounds, which often become serious if neglected.

2nd. Elimination of those absolutely unfit for work or suffering from disease dangerous to other workmen.

3rd. Careful watching may improve those having partial defects and may be made more efficient by treatment, change of work, etc. Advice may be given to prevent minor ailments from becoming serious.

4th. Creation of a friendly feeling between employe and employer.

The cost of the equipment for a first aid room or a shop hospital is not as great as may be supposed. The equipment shown in cut above is installed in the first aid room of the Duplan Silk Company, Hazleton, Pa. This company is adopting this equipment in all its mills. The equipment was furnished by the Bernstein Mfg. Co., of Philadelphia, a pioneer in the manufacture of sanitary steel hospital equipment.

FIRST AID ROOM IN DUPLAN SILK CO., HAZLETON, PA. BERNSTEIN MANUFACTURING CO. EQUIPMENT

Efficiency Makers for Manufacturers

By Warfield Webb, Chicago

AS an incentive to do better work, which is only another name for efficiency, there has been a concerted movement forward by some of the progressive organizations in many lines of industry making this nearer a realization. There are several roads that lead to the same end, and of these might be cited increased wages, annual gifts based on salary and service, employes' insurance, recreation, improved working conditions, environment and welfare activities of many kinds. The actual value of these depends, of course, upon the organization making the plan possible, and upon the nature of the labor performed.

To be more explicit there can be noted some of the more generally adopted ideas, and wherever these have been in operation a sufficient time to prove accurate results, the instances are ample to justify the adoption of similar plans by others. The organization considering any such plan should be guided by its individual case, and not by a general acceptance of the common idea. In other words careful study should be made of several plans and the decision reached after a summing up of the most practical for each individual instance.

ATTITUDE TOWARD EMPLOYES

One of the striking evidences of industrial progress to-day is the attitude of the owners of plants toward their employes, and the value this attitude is given by the increasing number of satisfied workers. There is, in other words, a mutual advantage thus enjoyed that becomes one of the very strong elements that must be in evidence, in order that there may be made possible the success that each in his way is seeking. There has come about in many manufacturing plants to-day a desire to please on the part of both employer and employe. The opposition that was natural a few years ago, for the most part of the employe toward the employer, has been dissipated by a very simple process. There has come about a better understanding, and the results have been to foster the fraternal feeling that brings with it united effort and real achievement.

If the worker can be made to feel that the employer has his interests at heart, there has been removed the most serious barrier that stands in the way of efficient accomplishment. Workers will seek to surpass each other in making their hours count for something worth while, and the spirit that actuates this desire will make the man of industry a power in his community. This same spirit is made more notable where there is something tangible done looking toward the uplift of the workers.

ABINGDON COTTON MILL Y. M. C. A.

AN ANNUITY SYSTEM

There is one large manufacturing organization that specializes in what might be termed an annuity system. This is based upon length of service with the company, and is figured on the rate of two per cent. of the annual wages paid such employes during a period of five years when the wages of such employe were at the highest figure, multiplied by the years of service with the company. The amount of annuity, of course, depends upon his service and wages, but in no case will this be less than $240 per year for life. The employe works for a given period and then is permitted to retire with what might be called an employe's pension. This has proven to be a very valuable help and an incentive to continuous service with this organization.

But in addition to this there is also granted to employes the opportunity of buying stock in the organization at a reduced figure, and then paying for the same in small payments, the amounts being credited to such as deposits in a bank pass book, and the interest being credited at the end of each year, thus reducing the amounts to be paid on the stock, or permitting the employe to withdraw the interest as he chooses. Many of those who take advantage of the offer allow their interest to accumulate. In addition to the above this organization does much to foster a greater interest and increased efficiency by all other methods of welfare work that will prove helpful in bettering the employes, thus offering a still greater inducement for more earnest work. It has proven of the most wonderful help.

INSURING EMPLOYES

The idea of insuring the employes of another institution, while they continued with the company, was tried out very successfully by a large company, the latter paying the premiums, and permitting the individual to name his his own beneficiary, and in no case requiring a medical examination. The amount of the insurance was based upon annual salary, up to a given amount, and then placed at a maximum, so that there would be an impartial amount allowed any employe. This was a stimulant to increase the efficiency of the individual to greater efforts, and the knowledge that his immediate family was insured against want, should he be taken away, was a material help toward better work. He would endeavor to do better work, and to retain his position, this one fact being continually in mind. After a period of experimentation it has proven of value to the organization.

One other industrial organization found that by increasing the wages of its employes there was increased effort

LOBBY OF ABINGDON COTTON MILL Y. M. C. A.

Group Picture Showing Plants of The American Laundry Machinery Co.
Number 1 CHICAGO - Number 2 CINCINNATI - Number 3 ROCHESTER - Number 4 TORONTO.

Where Machinery for The Textile Manufacturer is made

FULLING WASHER The American Fulling Washer supplies the most up-to-date method of fulling woolens. Gives unequalled results with economy in time and labor. Superior construction to any other type of fulling machinery, assures long life. American Washers awarded the Grand Prize at 1915 Panama-Pacific Exposition.

EXTRACTORS The American Overdriven Extractor rigidly constructed throughout. Mechanically designed for mill work. Reduces vibration to a minimum, and is an economizer of power and time.

PRESSES The American Automatic Underwear Press has no equal for finish, capacity and economy. Numbers 37 and 52 Universal Presses also specially designed for the Textile Trade.

LARGEST MANUFACTURERS OF PRESSING MACHINERY IN THE WORLD

THE AMERICAN LAUNDRY MACHINERY CO.

Specialty Department, Cincinnati, Ohio

H. G. MAYER, Southern Textile Agent **Realty Bldg., CHARLOTTE, N. C.**

to make their hours more profitable for the organization. Better work, more stability among the employes, and reduced operating costs followed. There was a great desire to labor to a definite end. This was made possible, as it has been proven in other organizations, by a more comfortable living. This is one of the serious and very essential factors in any industry. Make the men efficient with better homes, with more food and living conditions that are in keeping with the modern trend, and we have at once better help in all fields of endeavor.

EFFECT OF PLEASANT SURROUNDINGS

Feeling that the effect of pleasant surroundings would prove of benefit to the employes, one large manufacturing establishment, with large grounds surrounding the plant, hired a landscape gardener and improved the surroundings with shubbery, growing plants and flowers. It even had two greenhouses erected so that cut flowers could be had at all seasons of the year. Where there was sickness in the homes of any of the employes or their families flowers were sent gratis, and the effect in this and other respects was to make the hundreds of employes more aesthetic and of a greater force for good. Another company provided a plan somewhat similar, with the addition of a large park center and athletic grounds and similar forms of outdoor improvement with a regularly employed gardener, the results proving of wonderful help in making the employes more content and producing a like increase in efficiency.

DALLAS MANUFACTURING CO. Y. M. C. A.

PHYSICAL HELPS IMPORTANT

With the belief that it would be a helpful factor in developing the physical as well as the mental faculties, a large supply company inaugurated a plan of physical instruction with ample gymnasium, in connection with the work, and hired a regular instructor to give his time for the advancement of those who saw fit to take advantage of the plan. The spare time thus spent was such as to fit employes for more effective labor in their regular duties.

The building of an immense swimming pool in a city of the east, with the material assistance of funds furnished by a large manufacturing plant, where shower baths, in addition to a large cemented pool, open to both employes, their families and the public with swimming instructors, was given ample tests to prove its efficacy. This pool cost many thousands of dollars, and was not only a source of pleasure and profit to the users, but also the means of saving many lives from drowning in the two rivers that skirt the city, and where the toll annually had been large. This pool is open from June to September and supplies both hot and cold water for the shower baths, and the water is tested and the pool cleaned at frequent intervals. One day is set aside for the women and girls each week, though they are permitted to use the pool on other days as well. The number of bathers has increased wonderfully each year since its inauguration.

INSTRUCTION FOR BOYS

The desire to improve the lot of the workers and to make possible a more effective apprentice system by one prominent manufacturing company was the means of developing far more efficient workers among its younger employes, there being a regular instructor hired, and a part time arrangement made with one of the schools where the boys could be given such instruction as would fit them for workers who would become expert in some special field of endeavor. The results of this work by this company has shown most decided results, and has given these boys opportunities that were entirely out of their reach, enabling some of them to gain positions that place them in the highest ranks as efficient workers.

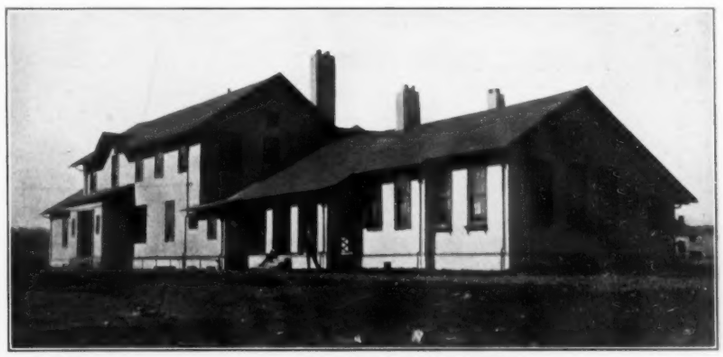
Empoyes' insurance and sick benefit have been proven of the best possible help in making it a factor for better and more sincere work. Employes' banks, to counteract the effect of the loan shark, and to induce the laying aside of at least a small portion of weekly earnings, has been productive of wonderful returns for another big company, where the habit of saving and the securing of death benefits, that enabled the family, in case of death, to be provided for, has been the means of keeping the wolf from the door, and enabling the fatherless and others dependent upon main supports of the household to be cared for in a manner that gave them at least a form of independence.

ACCIDENT PREVENTION

Preventing accidents, by throwing every possible safeguard about the employes of one large corporation, whose demands entailed more or less serious danger to the workers, prevented many fatal accidents. The formation of a regular organization with lectures, live suggestions and printed signs as warnings, has done more than a world of lesser means for the reduction of accidents by this company, and a larger share of interest on the part of the employes to co-operate with the heads of the company in its endeavors to gain this end.

It is but natural for any employe to labor more earnestly for his employer where the conditions have been more livable and pleasant. This must include living wages, sanitary surroundings, recreation features that are in keeping with sanity and some form of profit-sharing, insurance, loan possibilities and kindred ideas that are to be found in all progressive organizations in one or more forms to day. The employes' school has been one of the successful methods for the younger employes tried out with practical good. The welfare work has been proven of value to others, tried out for several years by one large organization with notable success. There is the goal, and the conscientious and earnest worker understands that in order to attain this he must labor all the more faithfully.

There are many methods that can be made effective efficiency factors, and these are often of so trivial a matter



WEST HUNTSVILLE Y. M. C. A., HUNTSVILLE, ALA.

The shifting of the workers to such places as they best seemed fitted for, where they could make real progress has been found of wonderful value.

To make the employe feel that his interests are those of the heads of the company is a big factor for successful operation. This can be done in a way that will not create a false impression of the position in which the employe is held. It can and must be done simply, whole-heartedly and with sincerity. The idea of giving the employes a substantial gift at Christmas time, based on the length of service and the amount of wages received, and figured at the yearly profits earned by the company, has been in amount, plus the real saving made to the company that adopts such ideas, that the only wonder is more of these progressive concerns have not as yet adopted the plan. The feeling that they will be the means of larger losses, and not the foundation of actual advantage and savings, has been dispelled by such institutions as have already given ample test to prove the value of this source of real profit. Each year, however, finds the number of industrial organizations seeking to adopt some means that will increase efficiency among its employes and decrease the cost of doing business, and of other losses contingent upon such palpable leaks.

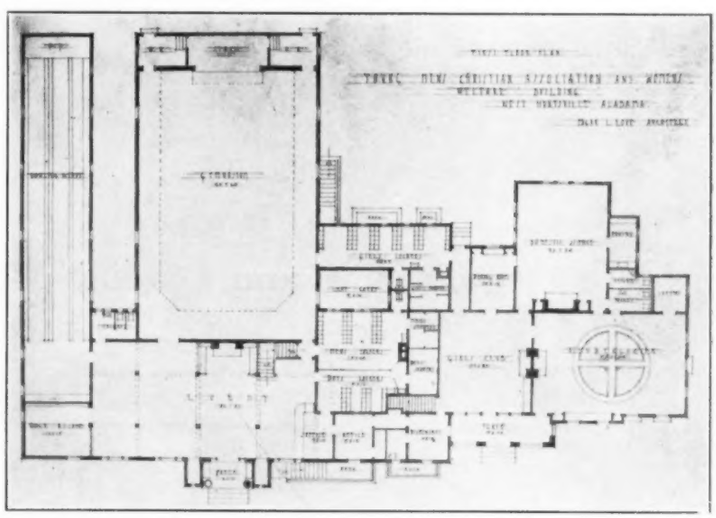
Mutuality-Basis of Welfare Work

By R. C. Forster, Charlotte, N. C.

THE employer and employe get together on a common platform. Each bears his part and results are accomplished. The Y. M. C. A. type of welfare work establishes its work on this mutual basis.

The universal demand for efficiency has stimulated the manufacture of better machinery and since the human factor cannot be entirely eliminated from the machine operation, the character of the worker is recognized to have something to do with the producing capacity of machinery. Hence, it is as important to have a worker of good character as it is to have machinery of the best type.

The object of the welfare worker is to develop the character. Character like the oak is not developed through paternalistic or hot house methods, but rather through bearing responsibility and resisting the elements. Work done for a man weakens him, to help him to do for himself develops him. The Y. M. C. A. type of welfare work puts the responsibility on the workers, who, through the discharge of this responsibility develop character.



FIRST FLOOR PLAN WEST HUNTSVILLE Y. M. C. A.—ILLUSTRATED ABOVE

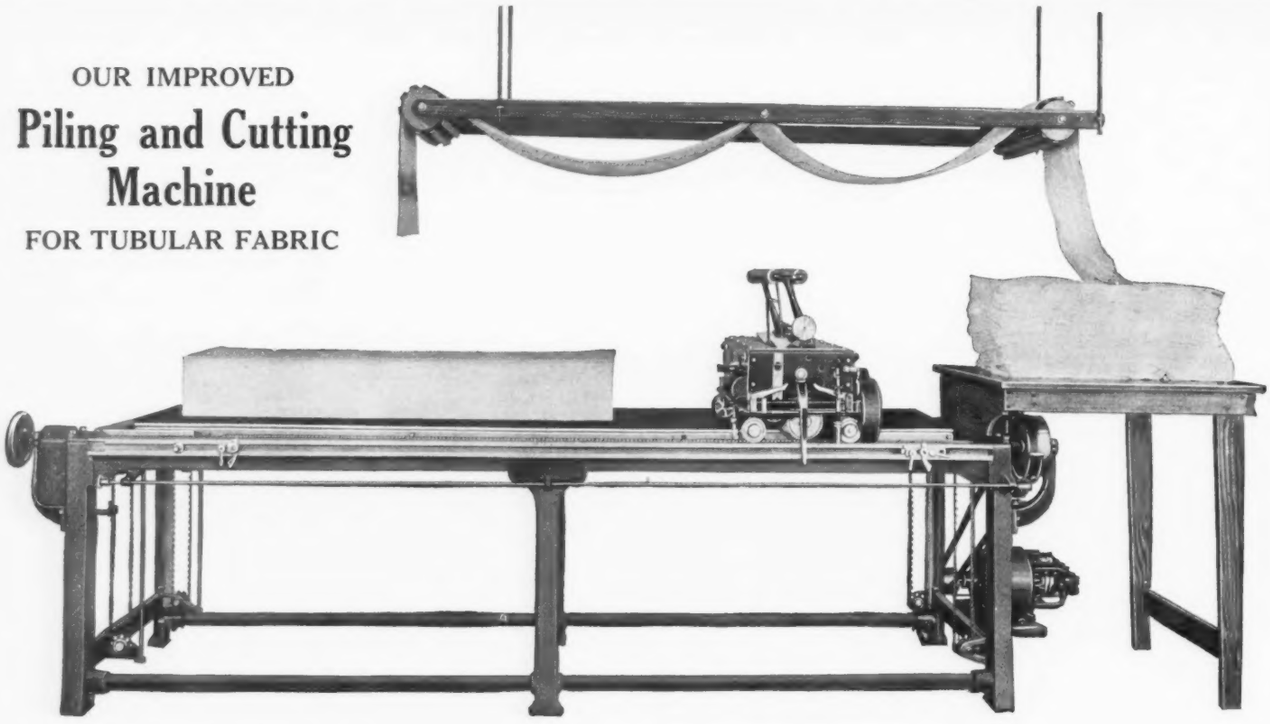
TEXTILE MEN IN WELFARE WORK

Textile manufacturers have been leaders in welfare work and have not been slow in recognizing the value of the Y. M. C. A. as an agency through which

OUR IMPROVED

Piling and Cutting Machine

FOR TUBULAR FABRIC



Piling and Cutting Time Reduced to a Minimum

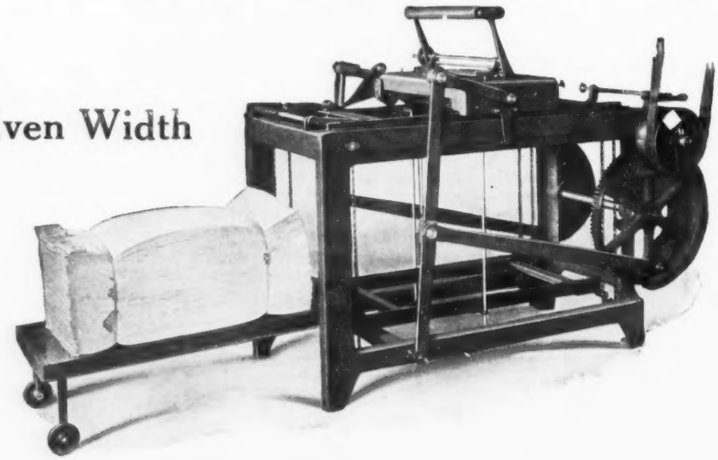
The Cutting Department is a very important end of the knit goods business.

Preparing the cloth ready to cut into garments is seven-eighths of the operation. That is what this machine will do for you mechanically.

With this machine, in a half hour's time, the manager can tell more about where his material is going than in a whole day where the operations take place by hand in several different parts of the factory. And better yet, the work is far more accurate than is possible by the most careful hand work of skilled operators.

Folding Machine to Insure Even Width

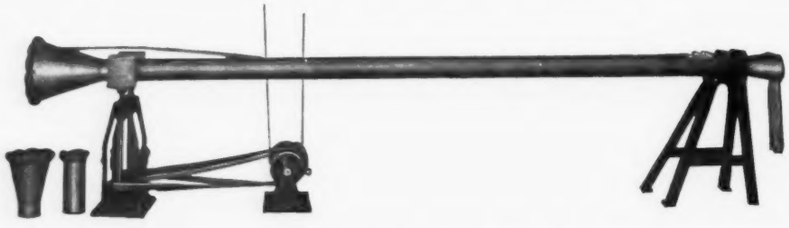
These machines are made in two sizes —No. 1 will take cloth from the smallest width up to 22 inches wide, No. 4 from the smallest width up to 28 inches wide, the only difference being in the width. The length of the fold is 34 inches. They have a capacity of 40 yards of cloth per minute.



Turning and Loading Machine for Tubular Fabric

An Automatic Turning & Loading Machine, especially designed to work in connection with our Folding Machine.

We also build special machinery for various operations.



THE GRAND RAPIDS TEXTILE MACHINERY COMPANY

Office and Works: 503 Grandville Avenue, S. W. GRAND RAPIDS, MICH., U. S. A.

to do this work. To-day there are nineteen Textile Y. M. C. A.'s serving thirty-four mill communities. These associations are using $332,000 worth of property. The annual expense of maintenance of these associations is over $57,000, of which the operatives contribute more than half.

Through the leadership of the secretary in direct charge emphasis is placed on committee service. Thus earnest workers are developed who apply their energies to the promotion of activities for the common good of the commuity.

The Y. M. C. A. reaches every individual in the community. This can only be done through committee service. Over 500 such committeemen did service last month. The people respond to this appeal to their common interests as the number that take membership indicates. For example, Kannapolis, N. C., with about 5,000 population, has 1,100 paid members; Hartsville, S. C., with 450 population, has 185 paid members; Piedmont, Ala., with 600 population, has 256 members.

MANUFACTURERS' OPINIONS

The following are extracts from statements from manufacturers:

"We all notice much less rowdyism. At the baseball games the boys show a different spirit to that formerly shown. Baseball games, in years gone by, generally ended in a general free-for-all fight, but now they are all conducted under the supervision of the various secretaries of the Y. M. C. A. and are pretty respectable affairs. There is no question in my mind that the Y. M. C. A. is doing a good work."

"Since starting the association a year ago, drunkenness in the village has decreased 50 per cent."

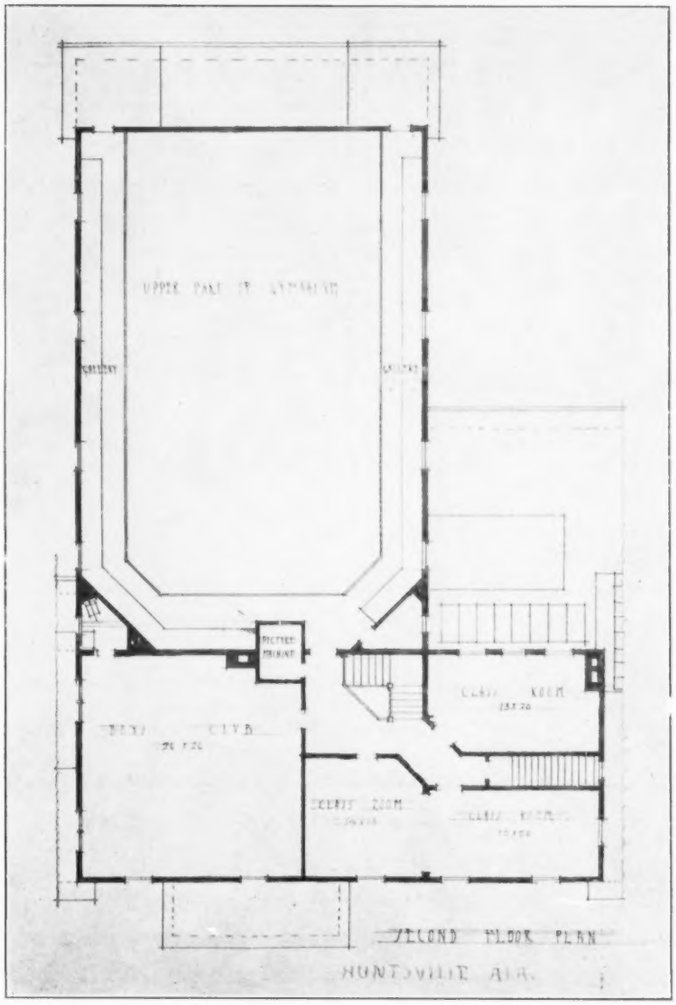
"We have been able to hold a better class of help; there has been less moving in and out. The efficiency of the operatives as a whole has been raised."

"The association has become such a necessity that we would not try to get along without it now."

"The association has done excellent work, and it has reached out and gotten hold of a lot of young men who heretofore have given us trouble. Lots of young men who have heretofore spent their time gambling and drinking can now be found at the building, playing games of various kinds."

"I have noted a decided improvement in the attitude of the operatives toward the corporation, and I cannot but feel that this improvement is due in a large measure to the spirit in which the welfare of the operatives is looked after by the Y. M. C. A."

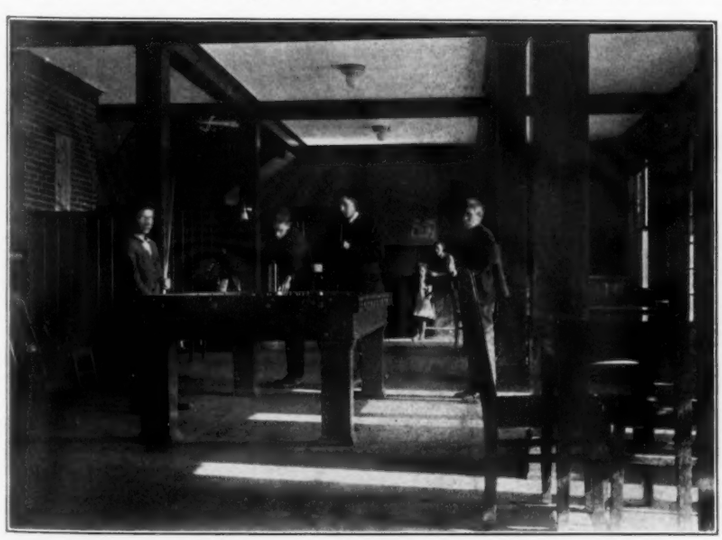
"When the Y. M. C. A. opened the habitual corner store loafers disappeared. They are all at the Y. M. C. A."



SECOND FLOOR PLAN, HUNTSVILLE Y. M. C. A.

THE HUNTSVILLE Y. M. C. A.

The accompanying illustration of the floor plan of the West Huntsville Y. M. C. A. building indicates the possible scope of the association's service to a community. All-round welfare is the slogan. The program of activities is not stereotyped, but is adjusted to meet the particular needs of the community it is serving.



LOBBY, WEST HUNTSVILLE Y. M. C. A. BUILDING

Schoolfield Welfare Work

By Miss Hattie E. Hylton, Danville, Va.

DANVILLE in the early 80's was a straggling town whose population was made up of as many negroes as there were white people—a condition which was at that time a great menace to the well being of the community.

The tobacco business gave to the negroes ample opportunity to make a living, while there was nothing whatever to afford the least chance for the poor and illiterate white people. This state of affairs induced earnest thought on the part of some of the most thoughtful citizens, who realized that something must be done to relieve this unequal and galling situation.

ESTABLISHMENT OF MILL

T. B. Fitzgerald, father of H. R. Fitzgerald, who had for a long time been studying the possibilities of the water power furnished by Dan River, and R. A. Schoolfield, conceived the idea of opening a small cotton mill. They interested three other men—the five of them furnishing a capital stock of $75,000, and the undertaking was launched. The industry has grown to such an extent that the capital employed is now ten millions—or more—and the plant affords occupation for about six thousand employes. As has, perhaps, been the history of all the earlier mills, in the South, for a long time our people had to give close attention to the mere success of the monetary side of the industry, realizing that without such success, other greater things could not come.

DESIRE TO HELP UNFORTUNATES

The desire to help their less fortunate fellow men, which was the actuating motive of the founders of the business, ran as an undercurrent throughout many years of its growth—now and then coming to the surface, and constantly growing stronger as it did, finally appearing almost as a mission to the spiritual eyes of the younger men of the firm. About the year 1900, the plan for the Schoolfield plant was projected, resulting in the building and opening of the same January 1, 1905. This village lies about two miles from the business center of Danville. From its inception, the plan was to make of this a model plant, one that should furnish lucrative occupation for the employe, under the best possible conditions, while giving every incentive to the promotion of efficiency in all departments of mill work, as well as every opportunity for ideal community life as soon as the people could be made ready for it. To this end it has been the plan to install as rapidly as was feasible such welfare activities as seemed best fitted to the needs.

HYGIENIC CONSIDERATIONS

Realizing that the key to great efficiency is the good health of its employes, our management has spared no pains or expense to prevent and cure disease. The land upon which our village is built is hilly, affording very perfect drainage, and in their building, the engineers conformed to the natural lay of the land. The company owns its own filtering plant, which furnishes, in abundance, delightfully pure water. Homes are equipped with modern sanitary outdoor toilets, built of the very best materials.

VALUE OF NURSES

In the beginning the very first uplift workers placed in the field were a force of visiting nurses; this has proven a very wise move. A nurse by virtue of her professional training, is often able to render services in the home, which win the gratitude, affection, and confidence of its members to a great degree—affording the entering wedge for other and more varied assistance.

Not only has the curative and preventive work of these workers been valuable, but they are in constant touch with the mill superintendent, and are able to keep careful check on the "hands," who "lay out," and can always detect the difference between a sick man and one inclined to be shiftless and intemperate. I should judge that in this detail alone the expense of these workers is justified.

By reason of the aid given by the nurses, one of our Danville physicians, a specialist in eye, ear, nose and throat diseases, conducts for us, one night in each week, a free clinic. He is assisted by a dentist and a regular medical practitioner. It is impossible to measure the good being done in this way to a large number of patients. The average attendance is 25, while I suppose the number of free operations by the specialist in his office and at the hospital would average three or more per month. These are largely for the removal of adenoids and enlarged tonsils, and undoubtedly few if any of these children would ever have this relief but for the free clinic.

Our nurses also regularly inspect the school children for constitutional diseases, and in this way many various epidemics are doubtless averted.

The day nursery affords kind, systematic, and intelligent care of the children of those mothers always found in a mill village, who by reason of desertion, shiftlessness, or general disability

DO YOU WANT TO MAKE MONEY

THROUGH A PROFITABLY LOCATED

KNITTING MILL

We know of a splendidly located town on our railroad where a knitting mill will make money if properly financed and intelligently managed. There are no such mills in the Southwest, although there is a large consumption of knit goods in that section.

Satisfactory labor, pure water, and cheap fuel are available. AN ATTRACTIVE PLACE TO LIVE. Jobbing markets and raw material close by.

A very attractive proposition is open to the right man. We would like some live wire to investigate and we will cheerfully furnish information.

COTTON MILL

There are several successful mills in Texas—One in Oklahoma. Three or four towns along our line in these States want a mill, and the business men in these towns would be willing to put some money in such a venture, with the right man or men.

Cotton mills in Oklahoma are exempt from taxation for ten years.

An extract from a letter written to us by the Secretary of an Oklahoma Commercial Club is quoted below. It evidences the attitude and interest of business men in our towns toward textile plants.

"We have received from cotton manufacturers about a dozen letters, but I do not consider more than three or four of them of any particular value. It will take an exchange of two or three letters to ascertain whether the parties writing have either money or experience. I believe that we could handle a proposition which includes half enough funds to complete the enterprise, for if the enterprise appears perfectly sound and the promotor shows up well upon investigation, a concern that would employ a considerable number of operatives could probably be half financed at home."

If you are interested in either proposition, write to us.

MISSOURI, KANSAS & TEXAS RAILWAY
1524 Railway Exchange Building
ST. LOUIS, MO.

Wm. Crabtree & Sons

MONTGOMERY, N. Y.

Mills at Montgomery and Newburgh, N. Y.

Worsted Yarns

BRADFORD SYSTEM

for

Knitting and Weaving

in White, Colors and Mixes

We specialize in Heather Mixtures for knitting and weaving

on the part of the fathers, are compelled to support, or help in the support of the family. It also gives sympathetic aid to the widow, often left with greater burdens than she could bear alone. This work is seemingly one of the most expensive features of our welfare department, but, as it affords a home for the resident welfare workers, some of the expense is capable of being distributed elsewhere.

CLUBS AND WELFARE WORK

There are active clubs to meet the various needs of the children, mothers, young men and young women. Among these are the Bluebirds, Camp Fire Girls, Boy Scouts, and Gymnastic Classes. Classes have also been successful in sewing, cooking, singing, basketry, etc. The baseball teams have been furnished with a good ball ground, and interest in this sport runs high.

The welfare office conducts a savings department, as a real factor in aiding the parents to instill in their children habits of thrift and economy. It is found also that this fills a need of the older people, who are glad to find a safe carrier of their funds to the Danville banks. The office holds a library of more than 250 volumes, and this is so much used and so many demands are made for books not in stock that very soon this will be enlarged.

SCHOOL FACILITIES

We have a new modern school building, with twelve classrooms, an auditorium, library, teachers' rest room, principal's office, both girls' and boys' playrooms, and rooms for manual training and domestic science. The building is equipped with slate blackboards, good desks, the very best heating and ventilating system, lavatories, bubbling fountains in each room, and is well lighted. In fact, it is hard to find a better equipped or better manned school. The enrollment the past year was 750 children, requiring a force of 17 teachers, and overflowing into the old schoolhouse, five rooms being in use there—a fact which demands in no distant time another building of like resources. The mill supplements the county term of six months, giving a full nine months' session.

All along we have had a good night school, but last term was the most successful of all. It is now permanently quartered in the new school building, where there is every facility for good work, and we can reasonably hope to double its scope of usefulness in the future.

There are now two sessions of kindergarten, with an average daily attendance of about sixty-five each—the last term enrollment was 393. We have a director in charge of this department, who has a strong force of assistants, and they are gaining the confidence and support of the mothers to a remarkable degree.

The public school, night school, kindergarten, and clubs combine in giving three great annual features, which have attracted much outside attention, as well as doing much toward the development of a spirit of community pride. The first in importance is the play festival, given in May of each year. Hundreds of children participate in the festivities of this occasion, and the thousands of spectators are extravagant in their expressions of delight at the performance. Next is the exhibit held at the Danville Fair. This is composed of school, kindergarten and club work, as well as much hand work done in the homes by the mothers, canned fruits, vegetables, preserves, and pickles, with many fine specimens of cut flowers, growing plans, ferns, etc., are exhibited. Tiny bolts of gingham, made by the school children, forming unique souvenirs, were dispensed at the last fair.

Last, but not least, of the three, is the great community Christmas tree, which on last Christmas gave out its first message of Christmas joy and good-will to many delighted and grateful hearts.

CIVIC PRIDE DEVELOPED

We have an active Civic League, through which medium we are striving to foster and develop a pride in every phase of the village life. The growth of this spirit is slow, but already the effect of the work done may be seen. The League offers prizes for the best vegetable garden, prettiest front yard, and best kept premises; and as a result there is a marked increase in the interest displayed in all lines of home improvement. We expect this interest to be very gradual in its growth, because of the perfect indifference on the part of many of the people to the improvement of anything that belongs to the mill. They say often "if the mill wants it done, let 'em do it themselves." Our league leaders are those who have none of this spirit and they can combat it better than anyone else can because they are of the people. Our village drug store has increased its sale of garden seeds 100 per cent. in the last two years of the league's existence.

Plans have been completed and accepted for a magnificent Y. M. C. A. building, work upon which has begun. This, of course, will fill a great and crying need, and will bring into play active forces for good, supplementing most effectively the work that is already in operation.

EXPENSE YIELDS RETURNS

In conclusion, let me say that although the expense of our work totals in the aggregate many thousands of dollars annually, it is the opinion of our mill officials that the expenditure yields large returns in the increased efficiency of its operatives, and they are strong in the belief that in time the full value of the work that is being done now will be demonstrated.

Sometimes workers get much discouraged, but we have only to contrast conditions now with those in the beginning to realize that our labors have not been in vain. We can see that the welfare movement gains impetus each year, and know that the future will bring its reward in the joy of the realization of our hopes and plans.

The management has at all times been most generous, and has backed the Welfare Department, not only with ample means, but with a spirit of deepest interest, sympathy, and understanding of the problem to be met, which, with the wonderful spirit of co-operation existing between every department of the work, has made hard things seem easy and kept courage high in our hearts. We are sure we can see that our work is gradually bringing about a higher degree of efficiency on the part of the employes, and it seems hardly too much to hope that it will finally break down and dispel the stigma which has so long been attached to cotton mills and their operatives.

Why Not a Women's Auxiliary?

By G. D. Crain, Jr.

AT a recent convention of textile manufacturers, covering a few states in the central section of the country, a good many ladies, including the wives and daughters of mill owners, were present to enjoy the social features of the gathering.

Some of the ladies attended one or more of the sessions of the convention, though most of them appeared to believe that discussions of the business in which their men-folk were vitally interested would not prove attractive to them.

It was at a luncheon, at which a number of the manufacturers, with the ladies, were seated together, that some one made a suggestion which, while not acted on at the time, was extremely significant to those who have been bearing the brunt of the battle against unfair legislation against the textile industry. The suggestion was, "Why not a women's auxiliary of this organization?"

One of the manufacturers present—a cotton mill owner, who employs nearly 1,000 hands, practically all of them women—has had to do a lot of hard fighting to prevent unfair and unjust laws regulating the employment of women from being put on the statute books of his state; and in telling his troubles he said: "The members of the women's clubs are chiefly responsible for that.

"These people have no more idea of what the inside of a cotton mill looks like than they have been able to get from reading the articles of agitators, many of whom are equally ignorant. In one article on the subject, where the 'intense noise' of the mill was described, a reformer alluded to the 'clacking of the warps.' This is a new kind of noise in a cotton mill; but that is just a sample of the sort of stuff that is circulated every time a legislature in a state where textile manufacturing is being done gets together.

WOMEN'S CLUBS POTENT

"The members of women's clubs—which have become a powerful factor in many parts of the country—are not ignorant in the ordinary sense; they are simply misinformed. Many of them are well-educated along general lines, and they are cultured and refined. Moreover, they possess leisure that enables them to ride a hobby as far as may be necessary, regardless of the time and expense taken in the task. If they get the idea, from the sentimental bosh of the members of the sob-squad, that the cotton mills are unjust to their help, and that drastic legislation is needed to rescue our operatives from the clutches of the mill men, they are just sincere enough and just aggressive enough to start a fight which it is hard work to overcome.

"Another thing, the members of the women's clubs are known to be disinterested. If they take up a project as a matter of public interest they can immediately command the attention of the newspapers. In fact, many of the larger women's clubs and federations of clubs have publicity departments, and, when anything of this sort is taken up, the press is kept supplied with information giving only one side—and that is the side which does not reflect credit on the textile trade.

"The result is that when we go up to the legislature to oppose the enactment of an 8-hour law for women, or to point out the folly of unreasonable regulation along other lines, we find that public sentiment has been created in favor of this regulation. The women have been busy; they have been buttonholing their legislators—and, whether women's suffrage is a factor in the state or not, the legislators know that it is bad business to antagonize these powerful organizations of women—and the result is that we have all we can do, and sometimes more than we can do, to get the decision.

"If our own women, our wives and daughters and sisters and mothers, who are probably members of these same clubs that are responsible for a lot of the unreasonable bills that flood every legislative session, were to take an active, instead of a passive part in these movements, it would help to make things easier for us."

IGNORANCE ON THE SUBJECT

These suggestions were all regarded as pertinent and practical, but the weak point of the situation, as far as actually putting them into effect is concerned, is that feminine connections of mill owners do not as a rule know anything about the conditions in the plants, and do not show a great deal of interest about learning the facts. They group all of that under the head of "business," and "business," in the average household, is a distasteful topic for conversation. Just why this should be is somewhat difficult to understand, but it remains true that the average wife strives to prevent subjects connected with business from being introduced into the home circle, probably because she believes that her husband is entitled to a rest after the worries and cares of the day.

In the smaller communities where textile plants are in operation, the womenfolk of the executives connected with the mills usually take a more or less definite interest in the workers, from a personal standpoint, and carry on a considerable amount of welfare work among them. This brings them more often into the homes of the operatives than into the mill, though it is true that in communities of this kind, where the industry is the big interest of everybody in the town, it is easier to become familiar with the details of the proposition than in the larger center.

In fact, in the big cities where there are considerable numbers of textile manufacturing plants, the lack of knowledge of working conditions on the part of women whose husbands and sons and brothers are financially and personally interested in these industries is most marked. That is partly because there are so many other claims on the time and interest of women-folk of the larger cities; but this very fact emphasizes the desirability of having them informed, because it is in those cities that the women's clubs are most active, and develop the greatest influence in molding public opinion.

POSSIBILITIES FOR THE WOMAN

It is hard to measure the potential capacity of a well-informed woman who has undertaken to correct misimpressions regarding the business. Take for instance the educated, well-informed wife of a big mill man, who in her social and other connections is brought into contact with the other prominent ladies of her community. Suppose she has made a point of going through the mill—not as a casual visitor, but as an interested student—and finding out just what the actual conditions are. She will have seen how much care is taken to prevent accidents; she will appreciate the efforts which have been made for the comfort and convenience of the help in the form of lunch-rooms, the sanitary arrangements, etc.; and she will see that the operatives are well-fed, in good condition and contented in their work, instead of staggering under the prods of a heartless overseer, as the reformers would have the public believe.

WHAT COULD BE DONE

If she were to attend a woman's club meeting, and hear the subject of cotton manufacturing discussed, with the usual loose talk about "intolerable conditions for women," and the other pet subjects brought up in this connection, she would

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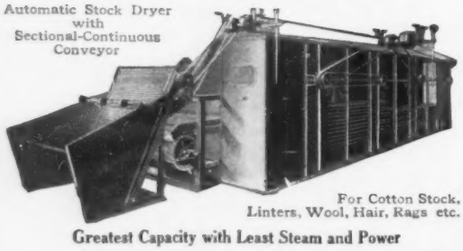

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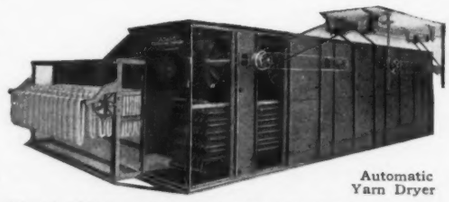

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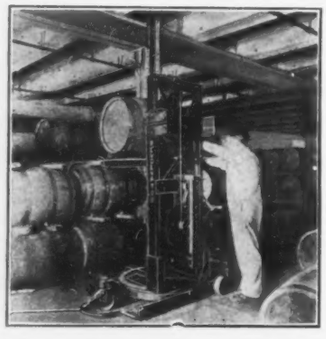
used to pile barrels. They are rolled on to the elevating platform over a short incline, the elevator is cranked up, swung around and the barrel pushed off on the rack. One man can do it without danger to the barrel or himself. Other commodities are handled just as easily. Write for Bulletin T. W. 27. It tells all about it.



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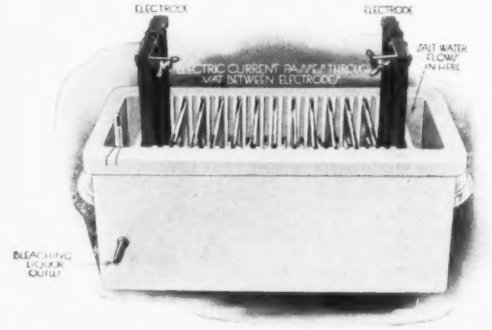

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be able to refute the statements, not by hearsay evidence, but by first-hand knowledge out of her own experience. She would be able to show in what respects those who had attacked the business had erred, and by reason of her information she would possess an authority that would entitle what she said to consideration. Her standing personally would give her words weight, and the club, instead of undertaking to correct evils which do not exist, would see that common-sense ideas ought to prevail, and would cease to be an active factor in stirring up trouble for the textile interests.

All this is a possibility, and not an actual condition, in most cases, simply for the reason that textile manufacturers themselves do not realize just how much their wives and daughters can assist them. Probably the average manufacturer would hesitate to ask a member of his family to enlist herself in the work of defeating unfair propaganda; but to the average woman of spirit, who, like many representatives of her sex in this twentieth century, is anxious to "do something," the idea of having a cause, and espousing it actively, would make a strong appeal. It would be perfectly proper for her to meet the issue whenever it is raised; and in fact it should be a source of embarrassment to her not to be sufficiently well informed about the business which furnishes her livelihood to be able to answer the arguments which are made against it in her clubs by her own friends.

INFLUENCE ON LEGISLATION

Women have so much to do nowadays with shaping legislation, especially the sort which goes under the general description of "reform," that it is well worth the while of everybody in the business to consider how to stem the tide and prevent the development of as much of the adverse kind as possible.

Women have more influence with women than anybody else, and that is why the efforts of those who are in the best position to find out things about textile manufacturing, and to disseminate the information, are likely to be well repaid.

One of the leading cotton manufacturers of the Central West, who has a reputation for the careful way in which he conducts his business, and the consideration he shows his help, recently had occasion to appear before a legislative committee to argue against an 8-hour law which had been drawn up at the instance of the women's clubs of the state. The women were there in force, and made impassioned pleas to the legislators, who did not seem to think that the business men had much ground to stand on. In fact, the attitude taken toward them was such that at the conclusion of the meeting he told a friend, likewise in the textile business, "We seem to be regarded as criminals here. Let's get away as soon as we can."

He really felt that, in spite of being a member of a great and legitimate and necessary industry, he had been branded as an enemy of society—all because the proper educational work had not been done so as to anticipate the sort of legislation that he was being constantly called on to fight.

A women's auxiliary organization in every state, armed with the facts, and getting the facts principally by means of personal investigation of the plants of their own relatives, would be a powerful force. It would probably be the deciding factor in determining the outcome of many a fight. It would nip in the bud a good deal of half-baked legislation which now comes to the surface so readily. In short, it would solve one of the greatest and most irritating problems of the trade.

Isn't it worth while?

Weight of Seamless Hosiery

By Opentex

TO determine the range of weights per dozen of mercerized seamless hosiery that can be made successfully on machines of various gauges and diameters requires considerable experience. This problem is often confused with the question of the greatest possible weight that can be produced. It should be understood that this article discusses the greatest weight that is practical per dozen on various gauges rather than the greatest possible weight, inasmuch as it is possible to make a much heavier weight of goods than it will be found practical to do.

The weight, of course, depends on the number of the yarn which is to be used. On a 3¾ inches cylinder, 136 needle machine, the range of yarns which it is practical to use would run from 2/24s to 2/14s and the weights would vary from 1¼ lbs. to 2 lbs.

On a 156 needle, 3¾ inches, diameter machine, the range of yarns would run from 2/20s to 2/32s and the weights would vary from 1 lb. to 1½ lbs.

On a 176 needle, 3¾ inches, machine, the range of yarns would be from 2/40s to 2/24s and the weights would vary from 14 ounces to 1 lb. and 6 ounces.

On a 188 needle, 3¾ inches, machine, the range of yarn would run from 2/50s to 2/30s, and the weights would range from 14 ounces to 1 lb. and 4 ounces.

On a 220 needle, 3¾ inches diameter, machine, the range of yarns would be from 2/60s to 2/36s and the range of weights would run from 14 ounces to 1¼ lbs.

On a 220 needle, 3¾ inches diameter machine, the range of yarns would run from 2/70s to 2/40s and the range of weights would run from 12 ounces to 18 ounces.

On a 240 needle, 3¾ inches, machine, the range of yarns would run from 2/100s to 2/60s and the range of weights would run from 11 ounces to 16 ounces.

RESULTS FROM WIDENING RANGE

The above figures are based upon what has been found to be the most practical range consistent with satisfactory results from a knitting standpoint. It is possible greatly to widen the range on each of these gauges, but, by so doing, it will be found that the waste, needle breakage, and seconds will run to excess. By confining these gauges within the range as above given, excellent results should be obtained.

It should also be borne in mind that the weight of the yarn used does not necessarily regulate the weight of the finished product, inasmuch as it is possible to change the amount of stock or the number of courses which the stocking contains, and in this way increase or reduce the weight of the finished product.

It is possible to use a number 2/50s yarn and a number 2/60s yarn on a 220 needle machine, and by increasing the number of courses or revolutions in the machine using the 2/60s yarns, to produce a stocking of the same weight as one made from the 2/50s yarn containing less stock or a less number of revolutions. It must be left absolutely to the knitter's judgment as to the amount of stock which the finished stocking should contain in order to give the proper elasticity or consistency to the finished product.

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You will receive prompt reply, giving particulars and prices, also any recommendation possible to help you select proper machines.

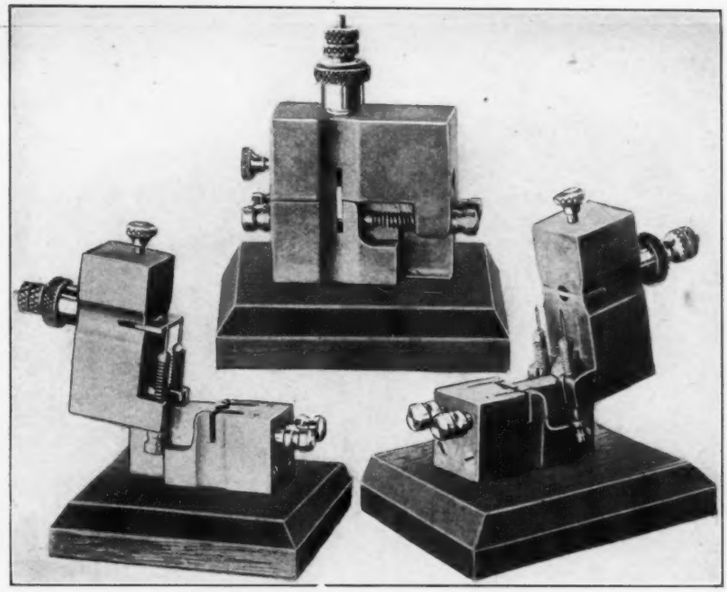
MICRO-PHOTOGRAPHY

(*Continued from page* 105)

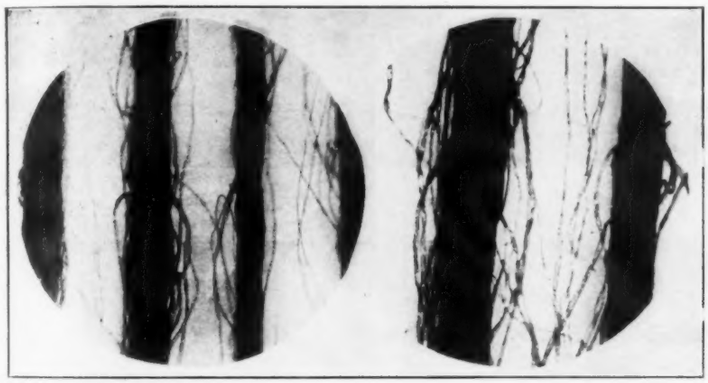
ment does its work in a most efficient manner is proved by the fact that exact weighings of any number of samples taken from the fiber selector have failed to disclose any but a negligible difference.

The fiber selector is made of brass, and consists of two oblong sections that are hinged at one end, being each approximately two inches long, one inch high and three-quarters inch wide. The essential part of the bottom members contains a slot 2 mm. wide and extending the width of the template, into which may be dropped a compressing hammer of fractionally narrower width, that is actuated by a spring and held in place by a set screw. The pull of conditioned cotton is placed in the slot; the hinged portion of the template is dropped on to the bottom portion, when the compressing hammer is released and the required density in the cotton is produced by its impact. To complete the cross section of fibers two needles are projected into and across the cotton below the hammer, just 3 mm. above the bottom of the slot; these needles hold the desired cross section in place, while two other needles, similarly projected but having their bearings in the upper half of the template, operate, when the top of the template is raised, to lift the surplus cotton away from the test portion of the pull. There then remains in the fiber selector only the cross section of the pull that is required for testing. The latter is carefully removed and placed between the jaws of the fiber tester. These jaws are always set 10 mm. apart and so arranged as to insure a straight pull on the cotton. At present the stretch or natural elongation of a group of fibers is taken up by the action of a weighted lever arm, the elasticity in grammes being registered on a quadrant scale; it being the same form of elasticity recorder as is used on hydraulic yarn and cloth testing instruments of the most refined type. It is not completely satisfactory for the fiber testing machine, and an improved type is now being developed that will make use of the hydraulic element of the machine. The natural elongation of the fibers having been obtained, the hydraulic part of the tester is then operated and the break registered and recorded.

It may be noted in this connection that there is a very close relation between the break of this standard group of fibers and the number of immature, unripe or dead fibers that are proved by the micro-photographic test to be present in the same type. The break test is also used to check the strength of the same standard group of fibers after these fibers have passed through the picking, carding, combing and spinning processes. For testing roving and yarns the usual instruments are used, but this testing is done at the mills. Standard forms are used for recording every detail of these tests, and complete record is available at any time for any type of cotton that has been used.



THREE VIEWS OF FIBER SELECTOR. AT TOP IT IS SHOWN CLOSED AND THE SIZE OF THE SLOT IS PLAINLY SEEN



COMBED COTTON YARN

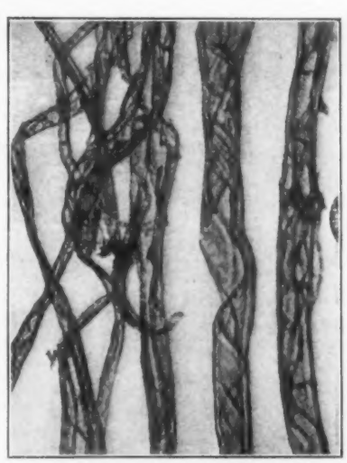
CARDED COTTON YARN

THE MICRO-PHOTOGRAPHIC TEST

As a preliminary to the micro-photographic test it is necessary to select thin pulls of cotton containing about 15 fibres and then make an observation under a powerful microscope to determine whether the fibres are properly adjusted to the field of the micro-photographic lens. In the Sharp laboratory a Carl Zeiss binocular microscope is used for observation purposes; this is equipped with adjustable iris diaphragms and swing-out condensor, the combination of which makes available a large variety of magnifications with a minimum of adjustments. It may be stated that micro-photographic work can be reduced to a minimum by careful observations on the binocular microscope. For instance, it is possible to determine by such preliminary observations the exact character of the cotton, micro-photographs being taken of only those pulls that are needed for permanent record to show the characteristics of a given type of cotton. In preparing mounts it is customary to clean the glasses thoroughly with Xylol. The desired group of fibres is then adjusted between the glasses and another observation is made under the microscope to see that the fibres are properly positioned. The double glasses are then glued together with asphaltum.

DESCRIPTION OF APPARATUS

The micro-photographic machine used in the Sharp laboratory is one of the most complete instruments of its kind made by the Bausch & Lomb Optical Co. It is not only adapted for taking micro-photographs from 8 to 500 diameters, but is also equipped for use in making screen examinations, if desired, with the same range of diameters. As shown in the illustration the photographing apparatus has been swung up out of the way so that it can be used for screen examinations; when photographs are to be made the photographic apparatus is dropped to a horizontal position, the lens being in a direct line with the microscope and carbon cylinder. The micro-photographic apparatus consists of three essential elements: The electric arc light at one end of the stand, the photographic apparatus at the other end, and the microscope. The microscope can be adjusted to any diameter by a micrometer screw attached to a graduated scale. The camera is of the bellows and plate type, and the lens and shutter are necessarily of refined types.



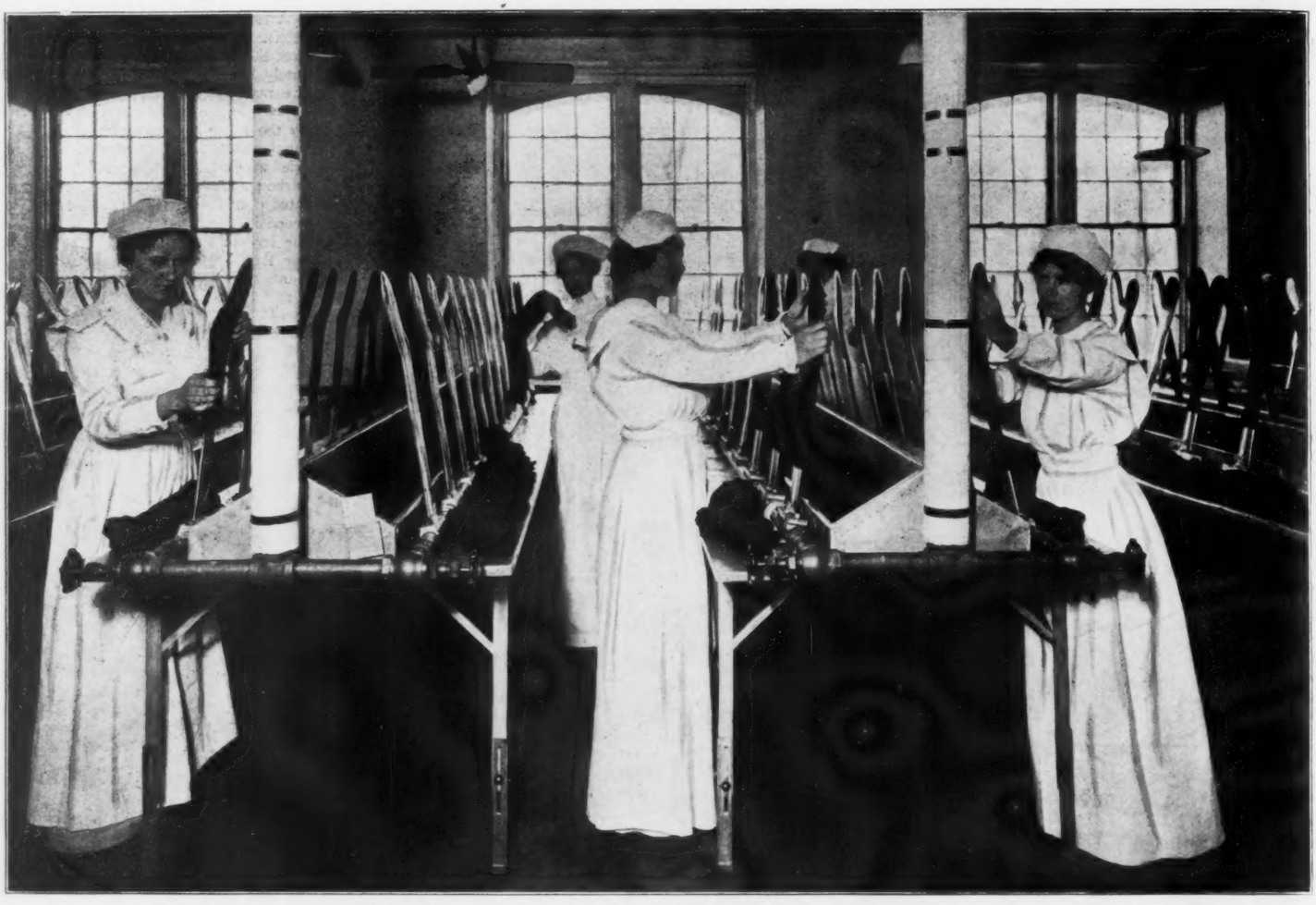
SPIDERWEB EFFECT OF FIBERS AT RIGHT DUE TO EXCESS MOISTURE CAUSING DISINTEGRATION

THE PROCEDURE IN MAKING NEGATIVES

After the slide containing the objective has been prepared it is essential that the stand of the machine be absolutely level. Each of the four legs of the machine is equipped with leveling screws and any inaccuracies disclosed by the spirit level are corrected by the manipulation of these screws. The electric wire is then connected with the carbon cylinder and the light is regulated until it burns steadily. The microscope is then fastened to its stand and the lens is set to the diameter desired for the picture. The usual magnification for fibers is 250 diameters and that for yarns is 20 diameters, both of these standards being used in the Sharp laboratory. The camera adjustments are then attended to, after which the slide containing the objective is placed on the microscope and the proper camera focus obtained after a good field has been found, the usual ground glass plate being used in the camera while taking these observations. The time of exposure depends upon the size of the field and upon the rapidity of the plate. Some of the best results are obtained by the use of a slow plate, with exposures of three and one-half to six seconds; best results are then obtained by developing the plate slowly.

BAUSCH & LOMB MICRO-PHOTOGRAPHIC MACHINE

Successful operation of the micro-photographic apparatus requires much skill and careful attention to details, and it may be stated that the results obtained in the Sharp laboratory are claimed by experts to be most perfect examples of the art. Printed reproductions fail to do full justice to the sharpness and detail of the negatives. After micro-photographic records have been made the amounts are taken to a binocular microscope having micrometer stage of special type, made by Ross & Co., which may be used to measure both the diameter and length of the fibers. This is one of the finest instruments of its kind in existence. While the principal object of the micro-photographic test is to learn the development of the fibers as sompared with similar types of former seasons, particularly to show the number of unripe, immature and dead fibers, it is also used advantageously to obtain a record of the effect of machines and processes upon the fiber in its various stages of manufacture.



This equipment is using exhaust steam at atmospheric pressure

PARAMOUNT

(Trade Mark Registered)

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WAR ORDERS BENEFIT

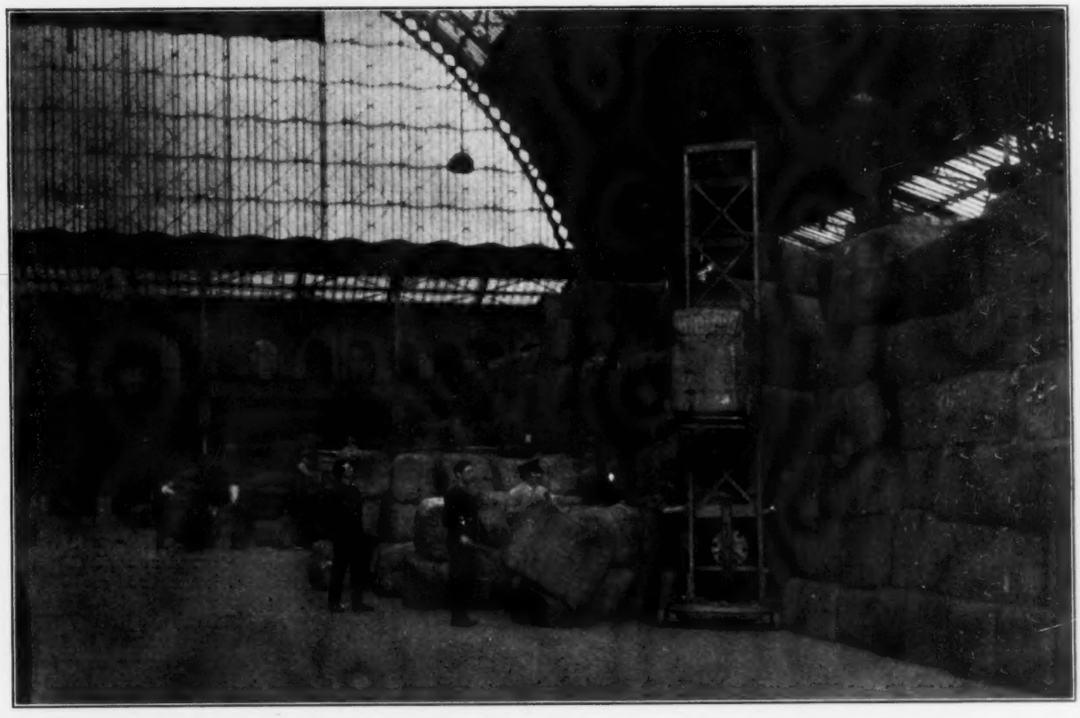
(*Continued from page* 49)

competition for any future business is likely to be much less active than has been the case heretofore. Prices of stock have gone skyward and the almost impossibility of securing fast colors added to that makes the lot of the manufacturer bidding on Government orders a very unhappy one. It is precarious business at the present time and the utmost care is being taken to prevent any mistake in the acceptance of orders which cannot be filled.

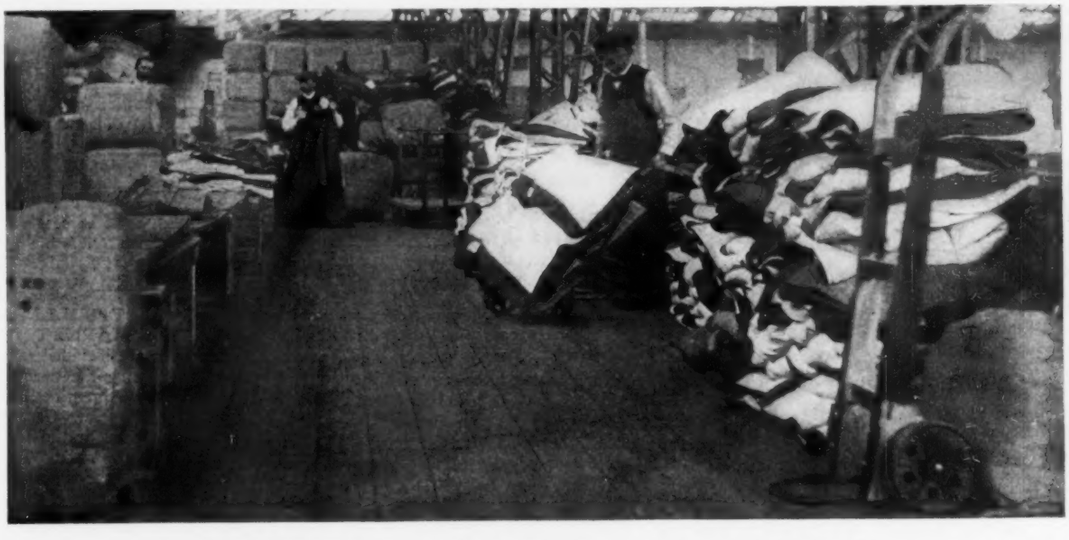
Portions of the knit goods industry went through a period of great excitement last winter in connection with contracts for foreign army supply. The business began in a small way in the September following the outbreak of the war, and as manufacturer after manufacturer began to share in it, the market turned decidedly bullish and there was much false inflation and high prices because of the army contract demand. Wool socks were among the first directly to benefit, and large orders were placed until demand began to swing toward 84-needle, 2½ and 3 pound cotton socks as a substitute. These goods were available at lower prices and in larger quantities than were the wool socks. Demand gave every indication of being large, until a speculative element entered in, which eventually brought much of the hosiery war order business into disrepute. Buying was done by various persons who had no direct connection abroad in the hope that the market would rise to higher prices and that they could eventually dispose of their purchases at a profit. This expectation was not realized, however, as the war orders came to a sudden end, and those who held goods on speculation were compelled to sell them at a loss to the home trade, if they wished to move them at all. Since last spring there have been few war contracts placed in hosiery, and as a result the 84-needle sock has been unable to hold its price, and the increased production built up in anticipation of continued export support has no channel for adequate distribution.

Large orders were also placed last winter on fleeced cotton underwear, heavy wool goods and sweater coats. War orders prevented flat wool manufacturers from suffering through lack of domestic demand. Fleeced cotton underwear, which started in a large way for army supply purposes, was taken up by the European civilian trade, and to-day maintains the most permanent benefit achieved by any branch of the trade. Cotton ribs were never successfully sold in large quantities for army use, and one of the few large inquiries which came into American hands was eventually placed with Canadian mills. American hosiery and underwear has at various times been bought by England, France, Russia, Belgium, Italy and Serbia, but as buying to-day for the Allies is concentrated in the hands of one large banking house it is difficult any longer to distinguish for what country the goods are destined except through full knowledge of the shipping instructions.

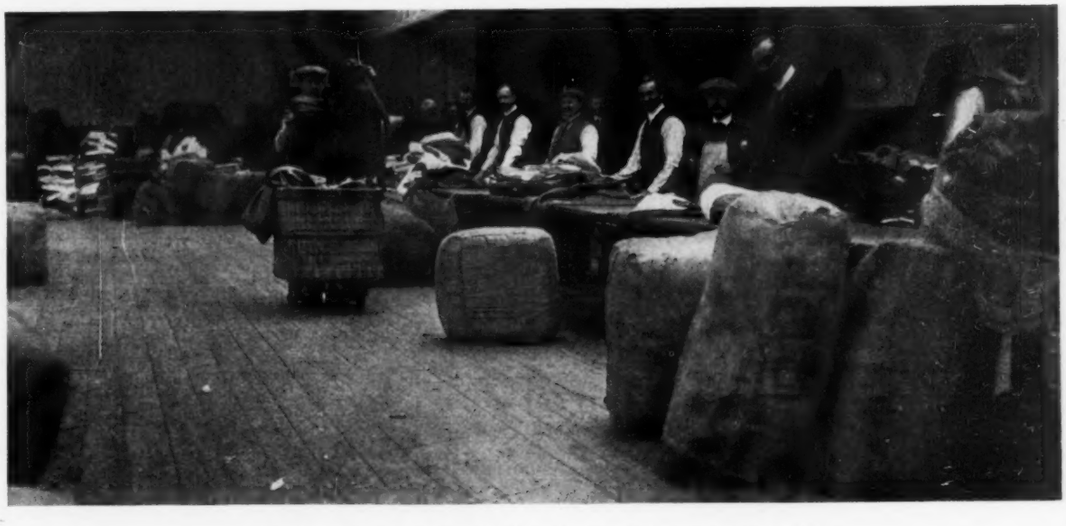
Canvas belting has very largely replaced leather for the accoutrement of soldiers and the fact goes some way to explain the prosperity of certain sections of the cotton-spinning business. It is difficult to get delivery of such counts as 24s, because these yarns, heavily folded and re-folded, are wanted for web equipment. The tapestry carpet manufacturers promptly took up the weaving of this belting, and looms intended for 27-inch goods were at work on fabric 2½ to 3 inches wide.



BALES OF BLANKETS READY FOT TRANSPORT FROM ENGLAND TO THE ARMY ON THE CONTINENT



SORTING OUT THE VARIOUS SIZES IN OVERCOATS FOR CLOTHING ENGLISH SOLDIERS



SORTING OUT COMPLETE TUNICS IN DEPARTMENT OF BRITISH WAR OFFICE

COLOR AND WEAVE

(*Continued from page* 106)

siderably more than is shown if a solid stripe is to be made.

OTHER EXAMPLES

Perhaps the best proof of the possibility of obtaining solid stripes by cramming the reed, or by introducing a large number of threads per inch of a given count, is to exhibit a fabric such as that photographically reproduced at D, in Fig. 9. This is a narrow hat band or a waist band, the warp of which is all cotton while the filling yarn is white paper. The broad central band of solid green is bounded on each side by a narrow white band. Not a speck of the white filling can be seen on either side of the fabric, the pattern has been doubled over to prove this. In this particular example there are 88 threads per inch and only 26 picks of filling per inch. The great difference in the number of threads per inch and the number

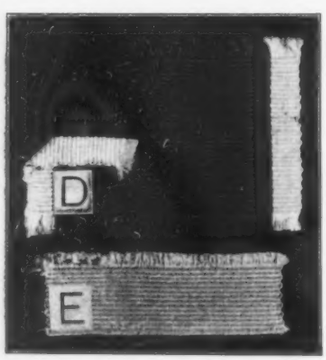


FIG. 9

of picks per inch results in a compound fabric of the type illustrated in Fig. 5, but in which the warp threads are comparatively fine. In all cases the effect, instead of being similar to the ordinary plain cloth as illustrated in Figs. 3, 7 and 8, is of a rib or repp character. The great advantage of obtaining solid stripe effects by this method of weaving is apparent, for the weave is simple and so is the mechanism of the loom, and, since the picks per inch are comparatively few in number, the production of cloth will be great unless some difficulty is experienced in forming a clean shed with such a large number of threads per inch for the count of cotton used.

The fabric illustrated at E in Fig. 9 is identical with that at D, so far as the structure is concerned, but the sett is finer, the pattern contains 104 threads per inch and 26 picks of filling. The warp threads are all light blue cotton, and the filling is light blue paper. When conditions such as these obtain, it is naturally quite an easy matter to obtain a solid color effect, provided that the dyeing of the yarns is uniform, even if the warp threads were not absolutely close together. But even with these advantageous conditions the color of the pattern E is no better than that of the green warp cotton threads in pattern D. It will be observed that if any color other than blue were used for the filling in pattern E, this color would show at each selvage where the filling turns for the next pick. The bent portions of the filling in pattern D are also visible, but this filling is the same color as the narrow stripes at each selvage. In all such cases, the filling should be the same color as the selvage threads.

One might perhaps ask what connection the structure of the fabric has with the color effect which results. The structural effect has obviously an important bearing with regard to the character of the above-mentioned solid stripes, and it also influences in a marked degree the neatness or elegancy of the effects desired in other types of ornamentation.

The production of the foregoing solid stripe effects necessitates two distinct types of structure in the same fabric, but such a departure is not always permissable. Whenever it can be adopted, however, there is no limit to the variety of color, but on the other hand, these absolutely solid stripe effects form only a small portion of the complete range of color ornamentation.

EXPORT TRADE OUTLOOK

(*Continued from page* 44)

shown a falling off with the United States and an increase with England.

We must not be deceived by some of the "Urgent Delivery" business obtained during the past year. We will get more from time to time until the war ends, but it is not the sort of business that lasts after that. While the war continues we are certain to have better business conditions than usual on many lines with nearby countries, particularly those countries that can obtain reasonable freight rates from the United States and experience excessive rates from foreign countries. We note the enormous freight rates being charged to carry goods, and figure hopefully to sell in many places in competition with England, but experience shows we cannot compete on most goods. Time and time again recently the products of some of our most efficient mills have been offered in large foreign countries at low quotations, but invariably the orders were placed with England. It has been a great mistake for many of our best fabric producers to refuse to sell foreigners and even foreign governments on the required terms of a c.i.f. basis. Many an opportunity to gain a small foothold has been passed on to some small commission house or concern, who would take the goods from the mill and then meet the condition of the foreign buyer. This operation has often enhanced the price in consequence, on account of the secondary profit necessary.

While it is true that a number of large and important concerns have pushed directly into the export fields, with a desire to develop them, is is only replacing other factors that formerly existed in the same field. It has merely been a transfer of competing sellers to a considerable extent, yet it should prove beneficial later on.

OUR FAULT FOR FAILURE

Our failure largely to increase and hold the export field, while disappointing, is largely our error in not looking ahead at all times. We have not measured up to our English cousins, the merchants and spinners of Great Britain. Our mills fight the idea of selling goods far ahead. They have to figure cotton at a premium when they do attempt it, while in England it is usually the opposite. The cotton markets there sell at a big discount, while here at a premium, and foreign spinners are students of how to avail themselves of far away opportunities.

INFLUENCE OF COTTON LAW

Only as the year 1915 has passed we have observed the foreigner make us carry his cotton from him here. He has successfully charged us with all the costs and heavy freight interests. His straddle operations of buying cotton futures in Liverpool and selling them here have netted him from $10 to $15 on a bale profit. Then he only takes the cotton when he needs it. This year he needs less than most people realize. The trade associations closely allied with spinners and merchants are sending their ablest men among us to learn what we believe or intend to do. They successfully buy our cotton, manufacture it into goods, and beat us in the world's markets without the least difficulty. They rarely take risks. They constantly operate from a straightforward business standpoint. At the present time, in spite of the war, we cannot compete. We can only sell in the world's markets when England's looms are pushed to the limit to supply her trade.

The conditions of the war will not greatly affect the buyer after the war, for he will always purchase in the cheapest markets of the world. Of course, it is a long way off beyond the period of readjustment which will take place when the war is ended. It is more than liable to be several years, but by intelligent co-operation here we could easily progress to legitimate expansion.

IN CONCLUSION

In summary, it is clear that our largely increased consumption of cotton at home is in particular caused by large buying of goods throughout the United States to replenish stocks. It is not caused by export demand. That this home demand is now well satisfied for some months to come is further apparent. It should mean a speedy return to more nominal prices, thus again permitting a starting point for some future export business on the lines hoped for and not realized.

If our merchants and spinners would join hands as sensible business men should and create a powerful research bureau that is worth while, with able men to study every move and opinion of our foreign competitors for the world's trade, we would soon conquer the difficulties that prevent our proper expansion. The situation needs the study of men who have been in the business and can devote their time to making the constant changing conditions clear to our merchants and spinners, to the end that our natural advantages here will not be so successfully set aside by those keen operators of longer experience in Great Britain.

TWENTY-FIVE BEST SELLERS IN ARGENTINE MARKET

Several textile lines are included in a list of products comprising the twenty-five best sellers in the Argentine Republic, presented by M. Drew Carrell in *The Americas*, published by the National City Bank, of New York. The twenty-five best sellers, the lines of goods required in geratest volume, those which by reason of the natural demand in the market sell with greatest ease, in the order of the relative value of annual importations in the most recent normal years are given as follows:

Coal	$26,700,000
Dyed cotton cloths	11,000,000
Pitch pine	8,900,000
Jute (bag material)	8,500,000
Naphtha (gasoline)	7,900,000
Steel rails	7,700,000
Galvanized iron	6,600,000
Woolen cloths	6,500,000
Miscellaneous machinery (not including reapers and binders)	6,000,000
Iron ingots and plates	6,000,000
Railway cars (freight and passenger)	5,400,000
Cement	5,400,000
Automobiles	5,000,000
White cotton cloth	4,600,000
Olive oil	4,200,000
Cotton prints	4,000,000
Spruce pine	3,700,000
Mixed woolen cloths	3,000,000
Furniture	2,700,000
Rice	2,600,000
Lubricating oils	2,400,000
Reaper and binding machines	2,300,000
Iron wire and cables	2,000,000
Binder twine	2,000,000
Kerosene	2,000,000

DYED COTTON CLOTH

Forty per cent. of the supply of dyed cotton goods has come from Great Britain, 30 per cent. from Italy, 9 per cent. from Germany and 8 per cent from Belgium. In this kind of textiles the product of North American mills is comparatively unknown in the Argentine market. The line is a good and easy seller because there is a big sustained demand that in the absence of local production must be supplied from abroad. The future of North American dyed cotton cloths in the Argentine depends upon the willingness of the manufacturer to furnish goods and quote prices and terms that will compete with the products of European origin.

WOOLEN CLOTH

In cloths of pure wool the annual importations are valued at about $6,500,000 gold, and in mixed woolens $3,000,000. Up to now United States mills have been unable to compete with the products of European manufacturers. In mixed woolens Great Britain has furnished 68 per cent., Germany 16 per cent., Italy 8 per cent. and France 4 per cent. of the supply, and in pure woolen cloths Great Britain 63 per cent., Germany 16 per cent., France 13 per cent., Italy 4 per cent. and Germany 2 per cent. There is a limited domestic production of low-grade woolen cloth and woolen blankets. The output is so small, however, that it nowhere meets the local demand. It is still a question whether post-bellum conditions in Europe will give North American manufacturers a lasting chance in the Argentine.

WHITE COTTON CLOTH

The value of white cotton cloth imported into the Argentine during a normal year is represented by a total of nearly $5,000,000 gold. The Manchester mills, with 78 per cent., and Italian mills with 12 per cent., practically control the market.

The small trade enjoyed by the Italian manufacturer has been in the cheaper grades. Other countries have been unable to compete with the well known products of the British mills in prices. There is still considerable question as to whether they ever will be able to do so. A number of North American manufacturers have recently had their representatives here studying the possibilities of the market and some of them have been able to obtain a few trial orders. But it is doubtful if they will be able to make headway unless conditions in Europe are such as to materially handicap production.

The Argentine market for cotton prints, like other foreign markets in which Great Britain has built up a trade, has been the subject of careful study by English manufacturers. In this line more than in any other their industrial methods have enabled them successfully to meet competition and exercise control. North American manufacturers came down some years ago when there was an over-production in the United States and gave their British rival some concern. As soon, however, as trade in the United States became normal the new market was abandoned and has since been neglected.

British prints have practically controlled the market with 67 per cent. of the importations. Italian prints represent about 13 per cent. and German 10 per cent. Many of the popular British designs have been subjected to the competition of cheaper and lower grade imitations from Germany. The ability of the North American print to get into this market is still an open question. Difficulties at present encountered in obtaining goods from Great Britain may enable the North American manufacturer to obtain some substantial orders. If he is in a position to sell at competition prices, to extend the usual credit terms, and to cater to the requirements of the consumer in filling orders, and if he will use the best men he can secure for maintaining his connections, it is believed that he will be able to make his designs, colors and widths quite as popular and acceptable as those of his competitors.

Textile Mill Heating by Circulation of Hot Water*

By Albert Greene Duncan, Boston, Mass.

SINCE the days of the coal stove three methods of heating mills have been in use: *First,* direct circulation of live or exhaust steam at low pressure; *second,* fan or indirect hot air system, using either live or exhaust steam in heating coils arranged in a central battery to heat the air; and *third,* use of hot water through direct heating surface in the various rooms, heating the water with either live or exhaust steam in closed heaters. It is of the last method that this paper treats. With the widely distributed areas which are encountered in large textile mills, the gravity system of hot water circulation, or it might be called the house heating system, is usually impracticable, so that the third method here treated involves forced circulation of the hot water. The paper describes the method of handling the problem of properly heating the widely separated units of the Harmony Mills, Cohoes, N. Y., shown on the outline sketch (Fig. 1). The problem was given careful study, and the relative advantages and disadvantages of all the three methods of mill heating enumerated above were considered.

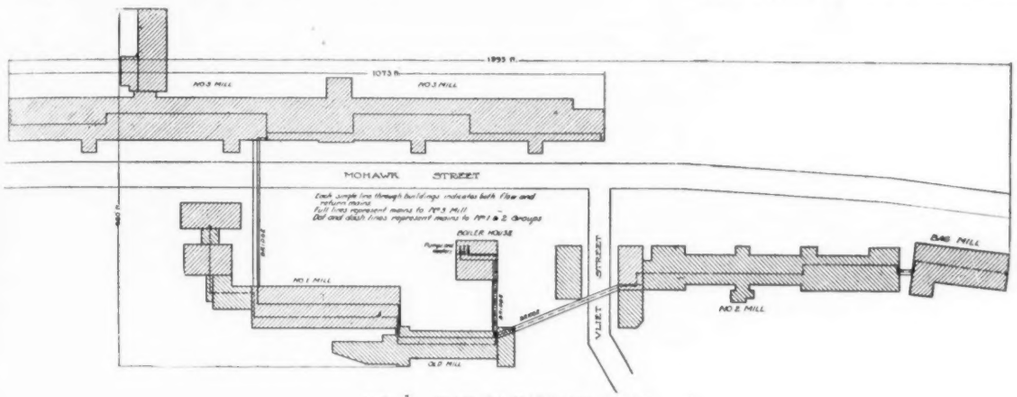


FIG. 1. PLAN OF HARMONY MILLS

REASONS FOR SELECTING THIS SYSTEM

A system of forced circulation of hot water was decided upon for the following main reasons: *a* The mills are primarily driven by water power, and the auxiliary steam plant which, by the way, is in daily operation to carry about 20 per cent. of the mill load, reaching a maximum of 50 per cent. in times of low water, is located at a central point, the distribution of power being by electricity. *b* The central plant arrangement necessitated the carrying of heat over long distances. Fig. 1 shows that heat must be carried from the power plant, a distance of 1,650 and 1,370 ft., in opposite directions, respectively. These distances are not measured in an air line, but owing to the location of buildings, the crossing of streets, and other peculiarities such as power canals, the mains were forced to pursue a somewhat more roundabout course than if the buildings had been built to fit a proposed heating system. *c* As certain of the mills were located below the level of the power plant a gravity system of return, either of hot water or steam, was impracticable.

The mills consist of seven buildings, varying in size from 40 by 100 to 1,073 by 76 ft., and an office building; they contain 825,434 sq. ft. of floor surface and have a cubic content of 10,354,000 cu. ft. The buildings present a somewhat typical condition in cotton mills, where buildings have been built of various types over a period of many years. The mills under consideration still use a building of three stories put up in 1837, and they occupy subsequent buildings, including their largest mill consisting of five stories with basement, built in 1876.

ARRANGEMENT OF SYSTEM

The heating system was divided into two sections for convenience of regulation. The general direction of the mills was north and south, and the east side of the longer mill was on the top of a bluff 80 ft. above the river and exposed to extremely high winds.

The mills being located in a northern latitude, where atmospheric temperatures of 20 deg. fahr. below zero are not uncommon, the question of different exposures of various portions of the plant was a special problem, the method of solution of which will be taken up in due course. Further than this, the plant, though comprising many buildings, naturally divided itself by its configuration into two manufacturing groups approximately equal in area; and consideration was given to the possibility, in times of curtailment, of shutting down either of these groups and running the other at full capacity. In the pumping plant one spare unit was provided to act as a reserve or relay for either of the two systems which, by manufacturing or weather conditions, need temporarily to be reinforced.

Given a power station in a central location and for distributing electric power where needed to supply the deficiencies of water power, the possibilities of centralized regulation of heat were naturally very apparent. From experience gained from this installation, the author has no hesitancy in stating that excessive use of coal in any mill heating problem is largely a direct consequence of the overheating of mills. With a distributing steam coil always at a high temperature, the local regulation of heat is generally left to the individual overseer, whose method of lowering the temperature is usually that of opening windows rather than closing valves. It was early determined in the present installation that the regulation of the heat in the various departments of the mills should not be left to the individual overseers, but should be placed under the charge of the engineer in the power house, long distance reading thermometers being there installed so that the temperature in different portions of the plant could be read at the power house. By this method, the two primary factors of heat control, namely, the temperature of the water and the speed of its circulation, could be accurately regulated in accordance with outside temperature.

While there was no engineering objection to solving the above problem by any one of the modern systems of direct steam heating, it was felt that the ability to control the temperature of water from a range of 100 to 240 deg. fahr., gave a flexibility to the system impossible of attainment in any other way. Practically stated, a steam system will operate economically only at full load, while a forced circulation of hot water can be readily regulated to meet all manufacturing and weather conditions and will maintain its efficiency at any degree of temperature.

FORCED HOT WATER VS. DIRECT STEAM

Hitherto, only the conditions of operation have been considered, and it may now be desirable to discuss the questions of relative cost of installation, as well as cost of operation, of the system under consideration and a modern system using direct steam radiation. A comparison of the amount of radiating surface required for forced circulation hot water system with direct steam systems shows this interesting condition: If exhaust steam at 2 or 3 lb. per sq. in. pressure were used in a steam system as a heating medium, the amount of radiation required would be practically the same as with a forced circulation hot water system, since the temperature of the heating surface would be practically the same. In extremely cold weather, with hot water the temperature of the surface could, however, be raised to as high as 240 deg., which would correspond to the temperature obtained at 10 lb. steam pressure. This temperature could only be obtained in the steam system by raising the back pressure or injecting live steam. The amount of radiation required for live steam heat diminishes as the steam pressure used rises. However, a point in favor of a decreased amount of actual radiating coils in a hot water system is that the mains can be figured as part of the heating surface, the circulation being so rapid that the temperature is adequately maintained to the end of the run with none of the choking and heat losses due to condensation where steam mains are used in the same manner.

Table 1. Heat Loss in B.T.U. Per Hour Per Square Foot of Exposed Outside Surface of Building for 1 Deg. Fahr. Difference in Temperature Between Inside and Outside Air.

	Heat loss. B.t.u.
8 in. solid brick wall	0.40
12 in. solid brick wall	0.31
16 in. solid brick wall	0.26
20 in. solid brick wall	0.23
24 in. solid brick wall	0.21
28 in. solid brick wall	0.19
Single window	1.00
Double window	0.50
Slate on tight wood roof	0.30
Standard mill roof 2½ in. plank T. and G.	0.18

The method of determining the amount of radiating surface required in various departments for a forced circulation system of hot water does not differ materially from the well-known methods employed in determining the heating surface of the number of heat units required for any other method of heating. Well-known factors were used in the installation described, and those in Table 1 are submitted as a basis for future determinations, bearing in mind that many modifying conditions apply

(*Continued on page* 241)

* Presented at Annual Meeting, December, 1915, of The American Society of Mechanical Engineers, New York.

Private or Purchased Electric Power for Textile Mills*

By Frank W. Reynolds and Dan Adams, Boston, Mass.

THE rivalry between the isolated plant and the central station has called forth many valuable and interesting papers, usually prepared by those most vitally interested either in the isolated plant or the central station. The not infrequent result is that the two debaters approach the same facts from opposite points of view and draw opposite conclusions from them.

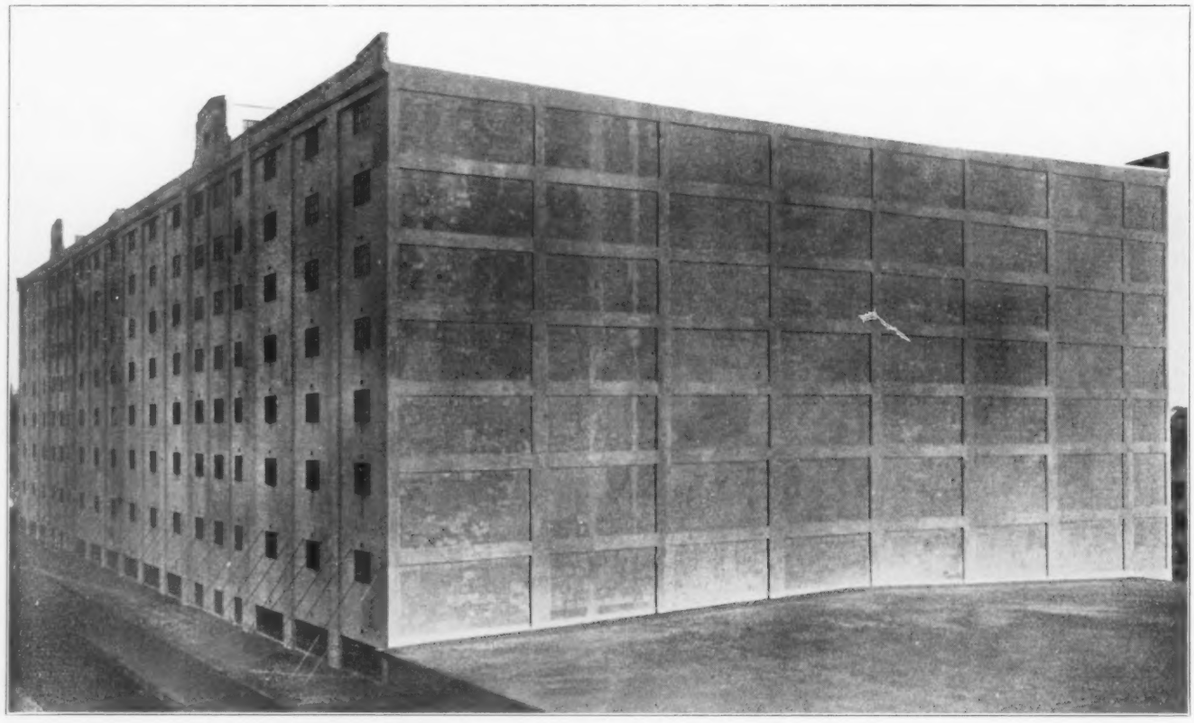
The central station advocate demonstrates that one kilowatt in the central station will do the work of several kilowatts in scattered small plants on account of the diversity in load; that the central station, besides requiring much less capacity, is also much cheaper per kilowatt than a number of small stations; and that its operating efficiency is higher, all of which is intended to prove that the small plant cannot compete with the central station in cost of power.

On the other hand, some mill engineers, manufacturers and other defenders of isolated plants show that the economic advantage of concentrating power in a large station is largely offset by the cost of distribution and high overhead expenses. Also, every mill must have a steam plant for heating and to supply steam for manufacturing needs. Many specific cases and figures are cited to prove that when these factors are properly considered, manufactured power is cheaper than purchased power.

Both sides are presented with equal sincerity and plausibility, and the inquiring mill manager is left without solid foundation of fact upon which to base a decision. It is perhaps safe to state that it is difficult to prove the general proposition entirely in favor of one side or the other. Each case is a prob-

(*Continued on page* 317)

* Presented at Annual Meeting, December 1915, of The American Society of Mechanical Engineers, New York.



C. R. Makepeace—Architect & Engineer Nashua Manufacturing Co. Warehouse—Nashua, N. H. Turner Construction Company—Contractors

Turner completes Nashua Warehouse in 7½ months

Some of Turner's New England Clients

Nashua, N. H.: Nashua Manufacturing Co.
Salem, Mass.: Naumkeag Steam Cotton Co.
Worcester, Mass.: Osgood Bradley Building.
Pittsfield, Mass.: General Electric Co.
Providence, R. I.: J. C. Doran & Sons.
Providence, R. I.: R. L. Greene Paper Co.
Providence, R. I.: Revere Rubber Co.
No. Weymouth, Mass.: American Agricultural Chemical Co.
Seymour, Conn.: L. E. Waterman Co.
Everett, Mass.: Bowker Insecticide Co.
New Bedford, Mass.: Merchant's Terminal Warehouse Co.
Woonsocket, R. I.: Taft-Pierce Manufacturing Co.
Woonsocket, R. I.: American Paper Tube Co.
Thomaston, Conn.: Seth Thomas Clock Co.
Waterbury, Conn.: Scovill Manufacturing Co.
Bridgeport, Conn.: Bullard Machine Tool Co.
Springfield, Mass.: Phelps Publishing Co.
Springfield, Mass.: Public Works Department.
Lynn, Mass.: J. B. Blood & Co.

The contract for this large textile warehouse, 320 x 160 feet, nine stories, was signed April 26, 1915. The building was promised for December 15, 1915. Despite the fact that the owners used the old buildings in the space now occupied by the second half until they could move into the first half, the entire building was completed December 13, 1915—two days ahead of time.

The cost per square foot for this warehouse is believed to be less than any other similar building in the United States.

Built in Reinforced Concrete

The Nashua Company selected reinforced concrete because it is lowest in first cost of all fire-proof construction and is more efficient than mill or slow burning construction. Concrete gives lowest insurance rates, lowest depreciation and affords maximum light and sanitation.

"Turner for Concrete"

The Turner Construction Company was chosen because of its experience and speed records—totaling to date 539 contracts in reinforced concrete in 14 years—an average of one every 10 days and every one right—without a single penalty for failure to complete on time.

Textile manufacturers who are thinking of building will be interested in Turner Bulletin No. 16. This describes the Nashua building, the reinforced concrete mill and storehouse of the Naumkeag Steam Cotton Company of Salem, and other industrial buildings erected by Turner.

May we send you Bulletin 16?

Turner Construction Company

11 Broadway, New York City **Prudential Bldg., Buffalo**

HEATING TEXTILE MILLS

(*Continued from page 239*)

which must be decided by the judgment of the engineer in each individual case. The difference in temperature figured in the case under consideration was 70 deg. and the heat as that required to heat the mills to 70 deg. in zero weather with temperature of water 212 deg. For temperatures below zero, it was considered that the ability to heat water to 240 deg. was ample margin of safety.

ing of doors into cooler hallways and elevator shafts to allow of transportation of stock in process, loss by the removal of warm air from picker rooms by the picker fans and loss by circulation of air from the picker rooms.

In comparing the cost of a forced circulation hot water system with that of a good exhaust steam system, it may be said that with the exception of the additional cost of the pumping plant required by the former, the cost of in-

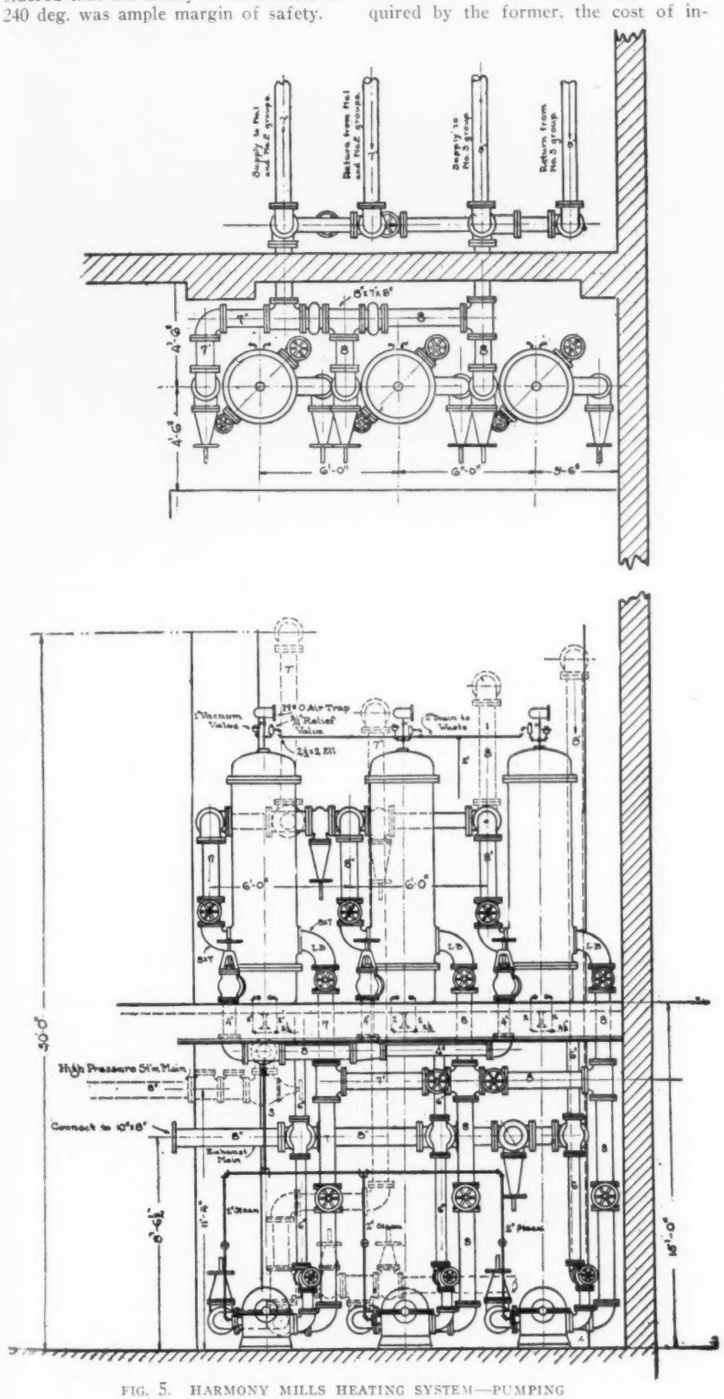


FIG. 5. HARMONY MILLS HEATING SYSTEM—PUMPING

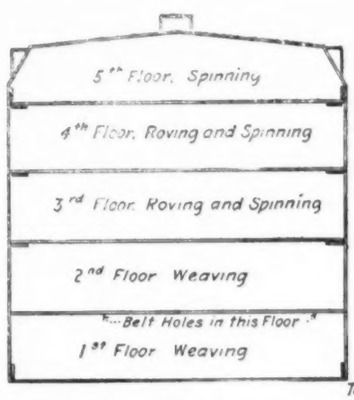
The engineer will find plenty of opportunity for the exercise of his judgment in determining the percentage loss of heat to allow for leakage, window exposure, roof exposure, and other factors depending in each case upon the location of the individual building. Many other problems arise from the character of cotton mill operation, and as a test of the judgment of the engineer may be mentioned the loss of heat from warm buildings by the open-

stallation of either is about the same. The cost of maintenance of the hot water system is believed to be much the lower by virtue of gradual rather than sudden changes of temperature of radiating surface and absence of water hammer.

The amount of radiation in the case at point was also calculated on the basis that the system would be adequate to heat up the mill following a shutdown of several days at zero temperature. On this account, no allowance was made for the well-known fact that cotton machinery gives off a great deal of heat during operation. Consequently, the theoretical water temperature necessary to heat the mills was found to be many degrees too high during ordinary running conditions.

THE PROPORTIONING OF HEATING COILS

Fig. 4, which refers to one of the largest of the mill units, will make clear the proportioning of heating coils. The departments in this five-story mill are shown in transverse section, together with the location of the heating coils on the side walls or ceilings. In this building there are about 1,500 belt openings between the first and second floors. The table referring to each floor shows in the first column the heat required without taking into consideration leakage and wind exposure; in the second column the heat required with these factors allowed for; in the third the heat actually provided for in proportioning the heating surface, and in the last column the percentage each floor contained of the total amount of heating surface in the building. It will be seen that the figures in the third column are not in the same ratio as those in the second column, although the totals are the same. The character of manufacturing operation in each department was a determining factor, and experience


5th Floor, Spinning
4th Floor, Roving and Spinning
3rd Floor, Roving and Spinning
2nd Floor Weaving
Belt Holes in this Floor
1st Floor Weaving

	1	2	3	4
	B.t.u. Required without Leakage & Wind Exposure	B.t.u. Required with Leakage & Wind Exposure	B.t.u. actually Provided For	Percentage Each on each Floor to Total Radiating
	1,810,000	2,672,100	1,778,000	24.0
	1,003,000	1,308,900	928,700	12.5
	877,400	1,158,000	1,348,100	18.1
	877,400	1,158,000	1,151,400	15.5
	865,000	1,128,900	2,219,700	29.9
Total	5,432,800	7,425,900	7,425,900	100 Per Cent.

FIG. 4. SECTION OF MILL UNIT, AND PROPORTIONING OF HEATING COILS

with the system later showed that more coils were placed upon the top floor and fewer upon the lower floor than were actually needed, this being due to belt openings mentioned above, and to the natural effect of heat leaking up through elevator shafts and other passages to the top floor of the mill, which also contained the spinning machinery, the kind of cotton machinery producing the most heat.

DESCRIPTION OF PUMPING PLANT

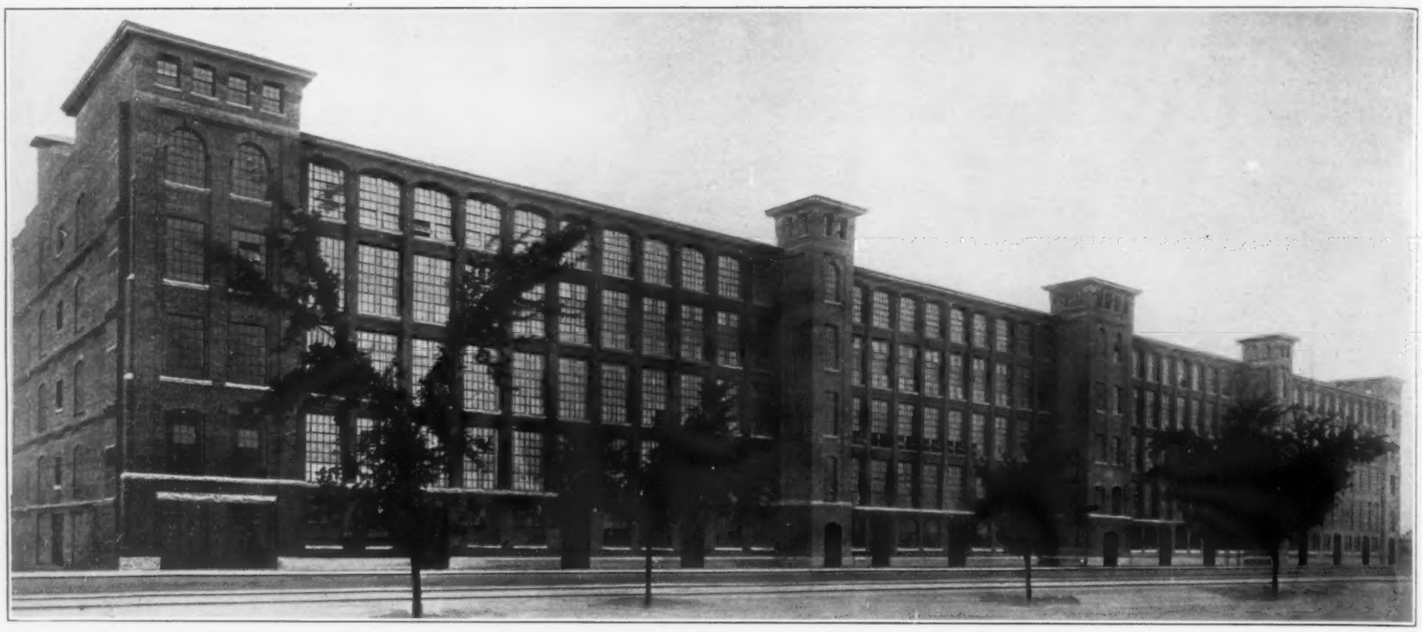
As may be inferred, the heart of a forced circulation hot water system is the pumping plant. A drawing of the pumping lay-out in these mills is reproduced in Fig. 5. The essentials of each unit of the plant are a closed heater of the ordinary feedwater type, together with a pump. Two pumps are normally used, one for each section of the mills. Each is connected to its own heater, and is so arranged that in case of breakdown, the third pump or heater shown can be used interchangeably with either of the two sections of the system. As to the type of heater for these installations, one with a short coil is preferable, to be run with the steam inside the coils surrounded by the water in the shell; this is an essential feature of the system, as the heater coal must be so proportioned as to clear itself readily of the water of condensation, which, at times of starting-up especially, is large in volume.

The heaters for this installation were of extra large capacity, and adapted to use exhaust steam to heat the circulating water in any but the most extreme weather when live steam is used. Their strength, however, was proportioned to receiving steam at full boiler pressure of 180 pounds, so that in case of an accident to a valve when using live steam no danger could arise from explosion. The three heaters were installed in connection with a boiler feedwater heater of the same size; and by a proper arrangement of valves, a greater or less amount of the exhaust steam furnished by the pumping plant and auxiliaries of the station could be used in the circulating water heaters, or the feedwater heater, as was required. The temperature of the circulating water could thus be maintained at any desired value. Whether the heaters were using live or exhaust steam, the drips were connected in an open heater to which the make-up water of the boiler plant was added, and thus were pumped back through the closed feedwater heater to the boilers.

In the case under consideration, steam turbine driven centrifugal pumps were used. No rule can be laid down as to the proper form of pump required, but each case must be decided by the character and service of the power station of which the system is a part. In the present instance, the heating plant was installed in a station used only as an auxiliary unit, and a large amount of exhaust steam from auxiliaries was not available at all times, the main steam turbine being run condensing under high vacuum. For this reason steam-driven pumps were installed, and it was found in practice that, except in extreme weather, they furnished sufficient steam to heat properly the circulating water. As the returns from the heaters were immediately delivered to the boilers, very little loss occurred in the transference of heat to the circulating water.

It can be readily seen that, in cases where a power station is used as a primary source of power, where large amounts of steam are used for service pumps or other purposes, an electrically driven or other form of power driven pump might prove most desirable. But it is the author's opinion that, unless the power plant in question operates on a twenty-four hour basis, a method of pumping by steam for a portion of each day should be installed, as it is the universal experience of textile mills that the larger proportion of the heat required during the twenty-four hour day must be supplied when the mill is not running. With the exception of a few departments, such as weaving, in any but the most extreme weather the heat engendered by the machinery is sufficient to keep the room at working temperature after 8 or 9 A. M. Details of this gain in heat from the machinery will be considered in due course.

As the system centers round the



No. 11 Mill for the Ludlow Manufacturing Associates, Ludlow, Mass.

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Plans and specifications are prepared for the erection and complete equipment of textile mills and other industrial plants, including steam and hydraulic power plants. The reorganization of textile and industrial plants is a highly developed function of this concern.

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CHARLES T. MAIN

Mill Engineer and Architect

201 Devonshire St. Boston, Mass.

(1-31)

pumping plant, this was necessarily installed at an additional cost over what would be required for a system of direct steam heating, but the advantages of centralized control and steady and uniform temperatures more than offset the additional cost entailed. Although the amount of this additional cost would vary in different plants, it may be stated that in the example under consideration the pumping plant cost 29 per cent. of that of the total system.

HOW RECORDS WERE COMPILED

After three years of operation, careful records can be given showing the result of the system in actual service. The steam pipe supplying the turbine pumps, from which also the live steam was taken for the heaters in case of need, was furnished with a steam meter and, as a check, all other lines in the power plant leading to the main turbine, for mill uses and other purposes, were also metered. The total result was checked by a venturi meter on the feedwater side, and over a period of years the sum of these metered results checked within approximately 5 per cent., an amount which could be easily accounted for by boiler blow-offs, leakage, emptying of boilers, and other minor losses. Another meter was placed in the branch line feeding the circulating pumps alone, so that by subtracting the amount of steam required to drive the pumps, the steam going direct to the heaters could be accurately determined. A third meter in connection with the heating system was installed in the exhaust pipe as a check upon both the amount and the direction of flow of steam, as to whether or not the heaters were receiving exhaust steam from power plant auxiliaries, or whether exhaust from the circulating pumps was being put into the feedwater heater supplying the boilers. Furthermore, two other flow meters measured all of the water circulating through each of the two parts of the system, and these two main pipe lines were equipped with recording thermometers, giving the temperature of flow and return in each.

During the first year, 1912-13, considerable attention was given to the compilation of data for the purpose of making a thorough study of the conditions, with a view to obtaining the best possible results. During a part of that year very extensive readings were taken throughout the mills of temperature, humidity, amount of radiation in service, number of windows open, if any, etc. At the same time recording thermometers giving the temperature of flow and returns in the power plant were checked up frequently. A summary of the records for the three heating seasons 1912-13, 1913-14, 1914-15, respectively, is given in Tables 2, 3 and 4.

During the first half of the 1912-13 heating season, neither the mill conditions nor the method of operating the heating system were on a regular working basis. Subsequent to Feb. 1, 1913, no changes of material consequence that would affect the heating requirements or the method of operating the system have been made in the mill. It will be noted from Table 2, covering the year 1912-13, that there is a reasonably close agreement between the total heat supplied to the heating system as shown by the steam passing through the meters and that calculated from the pumpage and temperature drop between flow and return. In arriving at the total heat units in the water, it is of course necessary to multiply the pumpage by the temperature drop on each individual day, for in compiling the average temperature drop for a week, each day has been given equal weight,

(*Continued on page 317*)

Week Ending	Average Outside Temp. Deg. Fahr.	Total Steam to Pumps and Heaters 1,000 lb.	Average Boiler H.p. Equivalent 24 Hr.	Total Heat in Steam Million B.t.u.	No. 1 Group of Mills: Per Cent Time System in Service	Total Pumpage Million lb. Water	Temperature Water Flow Deg. Fahr.	Temperature Drop in Ret'rn Deg. Fahr.	Heat Supplied to Mill Million B.t.u.	Mill Temperature Deg. Fahr.	Per Cent Total Radiation in Service During Working Hours	No. 3 Mill: Per Cent Time System in Service	Total Pumpage Million lb. Water	Temperature Water Flow Deg. Fahr.	Temperature Drop in Ret'rn Deg. Fahr.	Heat Supplied to Mill Million B.t.u.	Mill Temperature Deg. Fahr.	Per cent Total Radiation in Service During Working Hours	Total Heat Supplied to Both Mills Million B.t.u.
Nov. 9..	49	627	114	621	43	37.9	164	8.9	338	76	..	25	24.5	152	13.8	341	76	..	679
16..	45	745	131	738	45	36.8	159	8.9	329	74	..	23	22.3	165	11.7	263	76	..	592
23..	41	846	149	836	51	43.3	160	9.6	431	74	..	32	31.7	161	13.4	424	75	..	855
30..	37	928	163	919	49	43.1	165	10.6	460	72	..	37	36.3	169	12.8	465	74	..	925
4 weeks..	43	3,146	138	3,114	47	161.1	162	..	1,558	74	..	29	114.8	162	..	1,493	75	..	3,051
Dec. 7..	41	988	174	980	56	48.3	165	10.4	506	76	..	40	38.1	161	14.1	538	75	..	1,044
14..	30	1,994	350	1,968	99	86.9	170	10.4	902	76	..	99	97.2	165	11.3	1,101	76	..	2,003
21..	36	1,698	298	1,677	99	84.7	153	7.8	658	77	..	99	98.4	152	9.2	887	77	..	1,545
28..	30	1,939	340	1,912	100	87.6	163	9.4	825	77	..	100	98.6	164	11.1	1,094	77	..	1,919
4 weeks..	34	6,619	290	6,537	89	307.5	163	..	2,891	76	..	84	332.3	161	..	3,620	76	..	6,511
Jan. 4..	39	1,269	223	1,255	100	85.3	150	7.4	614	75	68	92	90.5	149	8.0	720	77	54	1,334
11..	31	1,427	251	1,410	98	77.3	153	7.7	586	73	61	90	86.3	151	9.5	834	75	64	1,420
18..	36	1,014	177	994	99	68.9	137	5.6	420	75	67	69	62.4	143	8.8	557	77	60	977
25..	36	1,015	178	1,000	100	73.2	135	5.4	410	75	61	92	83.3	136	7.3	623	77	68	1,033
Feb. 1..	33	1,108	194	1,091	100	71.6	140	6.0	429	74	61	93	84.8	138	7.8	677	77	70	1,106
5 weeks..	35	5,833	205	5,750	99	376.3	143	..	2,459	75	64	88	407.3	143	..	3,411	77	63	5,870
Feb. 8..	21	1,756	306	1,719	100	85.8	156	8.4	726	75	72	99	96.1	158	10.1	969	78	62	1,695
15..	17	1,877	327	1,838	99	83.6	161	10.4	848	75	80	99	91.2	160	10.6	981	78	62	1,829
22..	27	1,405	246	1,381	96	74.9	152	8.2	606	75	75	86	77.7	147	9.1	724	77	59	1,330
Mar. 1..	25	1,437	253	1,423	100	78.4	156	8.0	647	76	74	94	87.9	144	8.8	788	78	56	1,435
4 weeks..	22	6,475	283	6,361	99	322.7	156	..	2,827	75	75	95	352.9	152	..	3,462	78	60	6,289
Mar. 8..	22	1,562	275	1,546	93	77.0	154	9.0	704	74	75	93	83.2	140	8.7	723	77	59	1,427
15..	45	535	94	530	65	43.6	134	6.7	256	..	..	59	45.5	125	9.0	366	..	..	622
22..	43	375	66	371	56	40.4	130	4.7	194	..	..	34	27.1	130	5.8	156	..	..	350
29..	44	425	75	421	65	42.6	128	5.1	212	..	..	36	30.5	124	5.1	171	..	..	383
4 weeks..	38	2,897	128	2,868	70	203.6	136	..	1,366	..	..	55	186.3	130	..	1,416	..	..	2,782
Apr. 5..	46	347	61	344	67	40.8	130	4.8	142	..	..	41	32.0	124	6.0	184	..	..	326
12..	41	454	80	449	80	49.2	129	4.6	206	..	..	40	34.2	127	7.4	257	..	..	463
19..	53	139	25	138	37	18.1	125	4.9	49	..	..	13	10.8	118	9.0	76	..	..	125
26..	57	128	23	127	37	20.6	124	5.3	71	..	..	13	10.9	117	5.7	50	..	..	121
4 weeks..	49	1,468	47	1,058	55	128.7	127	..	468	..	..	27	87.9	121	..	567	..	..	1,035
25 weeks..	37	26,038	184	25,778	78	1,499.9	148	..	11,569	..	..	64	1,481.5	145	..	13,969	..	..	25,538

TABLE NO. 2

Week Ending	Average Outside Temperature Deg. Fahr.	Total Steam to Pumps and Heaters Thousand Lb.	Average Boiler H.p. Equivalent 24 Hr.	Total Heat in Steam Million B.t.u.	No. 1 Group of Mills: Per Cent Time System in Service	Total Pumpage Million Lb. Water	Temperature Water Flow Deg. Fahr.	Temperature Drop in Return Deg. Fahr.	Mill Temperature Deg. Fahr.	No. 3 Mill: Per Cent Time System in Service	Total Pumpage Million Lb. Water	Temperature Water Flow Deg. F.	Temperature Drop inReturn Deg. F.	Mill Temperature Deg. Fahr.
Nov. 8...	45	212	37	210	24	15.5	125	5.2	73	20	15.6	119	6.8	69
15...	41	318	56	315	28	21.2	122	8.3	74	29	25.2	114	8.3	68
22...	47	340	60	337	29	18.9	124	12.7	76	28	20.9	119	11.3	73
29...	38	637	112	631	48	33.7	125	7.7	72	47	41.2	123	14.0	70
4 weeks...	43	1,507	66	1,493	32	89.3	124	....	74	31	102.9	119	....	70
Dec. 6...	41	645	113	638	47	32.7	136	8.6	75	46	39.3	129	12.7	72
13...	30	1,019	179	1,008	85	47.1	128	6.6	76	91	66.3	125	10.0	73
20...	35	1,047	184	1,036	81	46.7	131	8.0	73	82	58.1	130	9.9	74
27...	30	1,104	194	1,093	84	54.9	135	9.7	69	81	62.1	133	11.5	73
Jan. 3...	17	1,762	310	1,743	96	61.1	146	11.2	69	96	74.5	149	13.8	73
5 weeks...	30	5,577	196	5,518	79	242.5	135	....	72	79	300.3	133	....	73
Jan. 10...	30	1,230	216	1,218	93	55.8	146	11.6	71	74	47.7	136	11.7	76
17...	10	2,219	372	2,199	95	62.5	171	18.5	70	90	62.7	163	18.7	72
24...	22	1,362	239	1,349	89	56.8	161	17.4	76	81	62.7	139	12.0	74
31...	30	1,006	177	996	83	65.0	153	13.7	74	60	46.5	123	8.5	76
4 weeks...	23	5,817	251	5,762	90	240.1	158	....	73	76	219.6	140	....	74
Feb. 7...	31	806	142	798	85	60.3	150	12.1	75	62	47.6	128	11.9	76
14...	9	1,789	318	1,771	91	62.4	169	19.4	70	85	62.9	146	13.3	77
21...	8	1,961	345	1,941	99	63.8	179	19.1	75	99	77.2	148	12.5	78
28...	14	2,134	266	2,113	97	59.8	183	21.7	77	90	65.0	163	15.5	77
4 weeks...	15	6,690	268	6,623	93	246.3	170	....	74	84	252.7	146	....	77
Mar. 7...	31	1,488	261	1,473	87	50.9	168	17.7	72	80	56.1	150	12.3	78
14...	26	1,563	275	1,547	91	54.6	171	18.8	75	90	64.0	155	12.7	76
21...	32	1,377	242	1,363	87	53.4	161	18.0	....	79	56.6	144	12.3	....
28...	38	1,166	205	1,154	76	41.8	164	18.2	....	72	47.4	145	12.2	....
4 weeks...	32	5,594	246	5,537	85	200.7	166	....	73	80	224.1	148	....	77
Apr. 4...	38	1,120	197	1,109	92	50.4	155	16.7	74	76	50.5	146	12.5	75
11...	39	1,081	190	1,070	75	42.2	162	16.8	72	71	44.5	144	10.2	74
18...	44	658	116	651	63	32.2	141	14.0	69	61	35.8	126	9.2	75
25...	50	121	19	120	18	7.5	128	14.8	67	6	4.2	118	....	....
May 2...	49	190	33	188	15	9.1	133	15.9	....	13	9.9	111	9.7	....
5 weeks...	44	3,170	111	3,108	53	141.4	144	....	70	45	144.9	129	....	75
26 weeks..	31	28,355	192	28,041	72	1,160.3	149	....	73	66	1,244.5	136	....	74

TABLE NO. 3

Week Ending	Average Outside Temperature Deg. Fahr.	Total Steam to Pumps and Heaters Thousand Lb.	Average Boiler H.p Equivalent 24 Hr.	Total Heat in Steam Million B.t.u.	No. 1 Group of Mills: Per Cent Time System in Service	Total Pumpage Million Lb. Water	Temperature Water Flow Deg. Fahr.	Temperature Drop in Deg. Fahr.	Mill Temperature Deg. Fahr.	No. 3 Mill: Per Cent Time System in Service	Total Pumpage Million Lb. Water	Temperature Water Flow Deg. F.	Temperature Drop inReturn Deg. F	Mill Temperature Deg. Fahr.
Nov. 7...	49	242	43	240	27	20.2	117	7.2	73	18	15.3	108	5.8	75
14...	39	569	100	563	58	43.3	125	10.6	72	43	39.7	111	7.8	74
21...	33	961	170	952	78	63.1	136	13.1	73	71	57.1	117	8.8	73
28...	32	1,333	236	1,320	97	72.0	150	26.4	74	89	70.5	128	11.8	77
4 weeks...	38	3,105	137	3,075	65	198.6	132	....	73	55	182.6	116	....	75
Dec. 5...	41	638	113	632	76	49.4	137	23.0	74	66	43.1	110	5.3	80
12...	31	1,203	212	1,191	96	69.4	153	28.1	74	86	63.1	126	12.7	80
19...	24	1,667	294	1,650	100	70.7	173	27.8	76	95	73.9	127	15.1	77
26...	16	1,972	348	1,952	100	68.4	173	32.7	73	99	75.6	142	18.8	77
Jan. 2...	20	2,379	419	2,355	100	74.0	169	14.2	75	100	85.5	157	15.5	78
5 weeks...	28	7,859	277	7,780	94	331.9	161	....	74	89	341.2	132	....	78
Jan. 9...	27	1,623	286	1,607	88	64.8	154	11.4	75	87	69.2	143	10.7	77
16...	31	1,323	234	1,310	87	63.1	149	9.5	73	83	65.8	139	7.0	81
23...	32	1,103	194	1,094	73	51.5	153	11.2	75	67	53.1	136	6.7	78
30...	23	1,424	252	1,410	84	55.3	155	11.1	74	81	60.7	146	10.2	78
4 weeks...	28	5,473	241	5,421	83	234.7	153	....	74	80	248.8	141	....	79
Feb. 6...	20	1,876	331	1,857	87	57.3	160	11.4	76	82	60.7	152	11.3	83
13...	26	1,399	246	1,385	95	58.4	146	10.7	74	91	65.1	131	7.9	77
20...	32	1,202	212	1,190	83	47.2	148	11.2	76	74	53.3	134	10.0	82
27...	36	750	132	743	63	35.1	138	10.2	76	48	34.0	124	9.6	84
4 weeks...	29	5,227	230	5,175	81	198.0	146	....	75	74	213.1	135	....	82
Mar. 6...	25	1,529	270	1,514	92	52.9	152	13.0	75	79	63.4	133	8.4	80
13...	33	972	171	962	81	50.3	138	11.1	73	68	52.8	126	8.6	78
20...	35	1,066	188	1,055	93	57.4	147	10.4	75	64	43.1	125	9.6	80
27...	38	917	161	908	77	44.8	145	9.8	71	61	46.1	125	8.6	80
Apr. 3...	34	1,082	191	1,073	90	55.1	144	9.3	....	65	50.3	132	8.3	81
5 weeks...	35	5,566	196	5,512	87	260.5	145	....	74	67	255.7	128	....	80
Apr. 10...	48	422	74	418	41	25.1	141	9.4	....	24	17.3	121	5.6	....
17...	50	275	48	272	28	15.4	141	10.3	....	24	17.5	121	6.0	....
24...	56	95	17	94	10	6.5	122	11.0	....	5	2.7	102	8.6	....
3 weeks...	51	795	46	784	29	47.0	135	....	....	21	37.5	115	....	....
25 weeks..	35	28,025	198	27,747	73	1,270.7	145	....	74	64	1,278.9	128	....	79

TABLE NO. 4

Steel Building Products for Immediate Delivery

The steel rolling mills are overloaded with orders and are unable to make shipments except on long-time deliveries. We foresaw this condition months ago and heavily stocked our yards with steel. Our preparedness enables you to go ahead with your building without delay.

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Means and Methods of Controlling Factory Fires

By L. H. Kunhardt, Vice-President and Engineer, Boston Manufacturers Mutual Fire Insurance Co.

AN event which is spectacular and in addition shocking as to its details, even though it be far distant, impresses the people of this country more than an orderly and gradual progression which much more vitally affects their well being. The reports of a sensational trial or the harrowing accounts of the European war are absorbed in every detail by eager readers, but the success attained in preventing the economic waste resulting from excessive losses by fire and the consequent greater security against injury to the individual, or possible loss of life, has received but little attention.

It is interesting to trace the slow development of thought to the point where obvious truth is recognized and applied. One of the causes of this slow development is that the public memory is short and the advances have been checked by reason of inertia or in other cases by the selfishness of the individual, and oftentimes by the inefficiency and lack of practical knowledge of those in whom is placed the responsibility for accomplishing the desired end.

The slow growth in the public mind during past years of the principles of good construction and adequate fire protection to assure safety to life and property is a striking example of the point in question. It is true that when a serious loss of life results from a fire, the public is awakened and the result is an effort to express by legislation what has already been put in practice by those who have been ready to profit by the knowledge gained from the experiences of others; but the remedy then follows the need rather than anticipating it.

FOUNDATION OF FIRE PROTECTION

A notable exception to this particular illustration is, however, the work of the New England Factory Mutual Fire Insurance Companies, which are in reality nothing more than an association of manufacturers organized originally for the purpose of reducing insurance costs and protecting their factories from fire.

The first of the companies was started in 1835 and it was the cotton manufacturers of that period, now over eighty years ago, who then laid the foundation of fire protection engineering. The development of slow-burning mill construction was due to these men, and its success in reducing fire losses was first demonstrated by them. Fire doors, fire walls, segregation of processes and isolation of the more dangerous ones from the main buildings, fire escapes, inclosure or removal of belts and substitution of electric transmission, removal of stoves and kerosene lamps, protection of gears, installation of self-closing elevator hatches and many other devices, brick stair towers, and last, but not least, automatic sprinklers, have all been the contribution of the cotton manufacturer to the development of the science of fire protection.

It would be as idle to assume that all these things were done for the safety of employes as it would be to assume that they were all done for the benefit of the manufacturer. Safety to employes goes hand-in-hand with safety and success to the business, and owners years ago came to recognize the fact that one cannot get along without the other.

Progressive manufacturers have long endeavored to improve the conditions under which their employes work and live. In the ordinary large manufacturing plant, the investment per operative is often as much as $2,500 and for each employe absent from work there is an economic loss and lessened efficiency throughout the plant. In addition, that part of the investment itself which the employe represents has for the time being lost its earning power and there is, moreover, the loss of wages to the employe. What is more essential, therefore, than that the safety of each employe be assured that his capacity maintained at all times? Any interference with the operation of a factory, such as may occur by fire, results in consequential loss to all connected with it, and as a matter of self-interest it behooves manufacturers to care for the safety of their employes as well as of their mill buildings. It is evident that what has accomplished one end has accomplished the other as well.

NOT ALL FACTORIES SAFE

It is not to be assumed that all factories are safe, for there are owners not sufficiently well informed or possibly not intelligent enough to appreciate that their profit depends upon safety. For these cases, legislation to require adherence to a proper standard is necessary, and I propose further on to outline what are the essentials of such a standard. Care should be taken that this legislation is not made unjust through ignorance of proper remedies, or does not go too far, or go in the wrong direction, and thus become a burden or handicap to legitimate industry.

It is also to be noted that recent fires, resulting in serious loss of life, have occurred in small factories and usually in those near the centers of cities where surroundings are more congested and the temptation has been to crowd too many persons into limited quarters not perhaps originally designed or intended to accommodate them. The larger factories and those more isolated from other exposures, as is usually the condition in the industrial establishments of to-day which have done so much to promote the success and reputation of this country, have given most serious consideration to the matter of self-protection with the result that they have been almost entirely free from loss of life when fires occur.

ENVIABLE RECORD OF PROTECTION

As emphasizing this, I may state that the records of the Boston Manufacturers' Mutual Fire Insurance Co. show that since the beginning of the factory mutual system in 1835, there have been but thirty-six lives lost in our factory fires, twenty-three of these being in an unsprinkled mill in Fall River in 1874, before the automatic sprinkler was developed and available for protection. Of the remaining thirteen deaths (all occurred since 1874), three were killed by going back needlessly into a burning cotton mill at a fire in 1907, evidently to save personal effects, and four were men of public fire departments, killed in the performance of their duties at different mills. This leaves only six employes who were not able to save themselves in a period of forty-one years to date. Even including all, only a total of thirty-six deaths have occurred in eighty years.

In factories covered by this record, all of which have fire protection and are of good construction, there are now employed 1,700,000 people, and there are in the homes dependent upon these workers at least 3,500,000 more people, so that it may be said that there are now in these factories, or dependent upon them, about 5,000,000 persons who are assured of almost absolute security from loss of their own lives by fire, or assured of the safety of the lives of those upon whom they are dependent, due to the safeguards provided by the owners.

Furthermore our insurance, it must be recognized, does not cover all the industrial establishments equipped with adequate fire protection, as our standards have been accepted to a considerable extent elsewhere. In cotton mills, for example, covered by the policies under the Mutual Cos., there are about 450,000 employes, and in other cotton mills there are approximately 200,000 more workers. Practically all of these have the benefits of fire protection, as nearly every cotton mill in this country is to-day reasonably equipped with fire protective apparatus, including sprinklers. At least this proportion may be fairly assumed to apply to other manufacturing properties, and on this basis it may be stated that there are in manufacturing plants alone, which have fire protection, nearly 2,700,000 employes who are practically safe as regards fire, and there are certainly about 6,000,000 more people dependent upon them. Thus there is a grand total of 8,750,000 persons in the United States and Canada who are enjoying the benefits of security of life from fires in factories. This is a very large proportion of the working people in this country as, of course, farmers and others not connected with factory work should be excluded from the calculation.

FURTHER PROGRESS BEING MADE

Add to the above the fact that department stores, mercantile buildings, warehouses and similar structures in cities, are improving their present construction in many cases and installing sprinklers and other fire apparatus, and that new buildings are being constantly erected in which the owners with full appreciation of the hazard of fires are insisting on the best construction and protection, and it will be evident to the unprejudiced observer that tremendous strides are being made in preventing loss of life by fire. In these classes there is estimated to be at least an additional 400,000 persons working under sprinkler protection. This is doubtless a very low estimate.

HOW RESULTS HAVE BEEN ACCOMPLISHED

Let me now enumerate the essential standards which have accomplished these results. In reality, there are only two main groups:

First. Construction, which must be substantial, designed to prevent the rapid spread of fire and adapted to the occupancy intended, and must take into consideration the chances of fires in certain processes and consequent hazards, as well as the number and location of employes accommodated in a given department.

Second. Private fire protection, or what may better be called self-protection, which must include as a primary feature a properly installed sprinkler system throughout every part of a factory where there is anything combustible either in the construction of the building itself or in its occupancy.

I wish especially to emphasize here that when there is anything that will burn in a building, no matter how fire-resisting or fireproof that building may be, it must be expected that the building will be burned out internally if a fire starts. The contents will burn just as a loaf of bread will burn in an oven.

To show that there is nothing new in all this, let me again quote from the records of the Boston Manufacturers' Mutual Fire Insurance Co., which by vote of its directors in 1858, among other requirements, laid down the following for a cotton or woolen mill to be insured at the then lowest rate:

"Building to be brick or stone with solid walls.

"Roof covered with metal or slate.

"Floors, plank with boards on top (the slow-burning type).

"Stairways in one or more projections of brick or stone.

"No openings in the floors from room to room (a great hazard in any plant).

"Elevators in the porch, or if inside to be closed by self-closing hatch.

"Force pumps and pipes from reservoir, hydrants.

"Fixed ladders and platforms at each story.

"Casks of water and pails at each story.

"Boiler room outside of mill.

"Picker room outside of mill and connected by passageway of brick with fire doors. Room to have perforated pipe sprinklers with proper supply.

"Good watchman's clock and half-hourly records by watchman.

"Waste and dirt to be all removed from mill before shutting down each day, and mill to be kept in good order at all times.

"Building not to be near enough to any other to be endangered thereby.

Add to the above the requirement for the automatic sprinklers which were developed many years later the value of which was immediately recognized, and we have what is to-day the foundation, as it was then, of good fire protection. Details have, of course, been perfected since, but I mention it all as showing that the manufacturers who developed and maintained the Mutual System were continually building up a standard for safety and were giving these matters thought far in advance of any laws relating to the subject, and it was necessary that they do this as a matter of self-interest, even if for no other reason; otherwise their property might itself have been destroyed by fire.

SAFEGUARDS TO BE EMPHASIZED

Let me emphasize that the most vital factor in preventing loss of life and property is the automatic sprinkler. This alone will render the great majority of fires harmless to life and of small damage to property. There must, however, be secondary safeguards briefly covered by the general name "slow-burning construction," which means walls of brick or equivalent, solid floors without openings between stories, stairs in outside towers, elevator and other openings protected, and safe arrangement of processes. Then, even if very rarely sprinklers fail for any cause, the spread of fire will be so retarded that the operatives can escape without harm.

In connection with the automatic sprinkler, emphasis must be placed on the need of a most adequate water supply for it at high pressure. Tanks of very limited capacity may check a fire at the start, but, if it gets under way, are quickly exhausted; hence for all large manufacturing plants or those of equal importance the main reliance should always be in a good public water supply or large resorvoir of adequate pressure and in fire pumps of ample capacity, the latter fed from large storage capacity independent of the public or resorvoir supply.

Proper handling of fire apparatus at time of emergency is essential and it is thus necessary that the best men at the factory be organized into a fire brigade, drilled occasionally in the use of the appliances and know the purpose of each. Mistakes are often costly; a valve on a sprinkler connection not properly cared for may be carelessly left closed and not opened even after a fire starts. The result may be disastrous. Hence each man should be trained in his duties at the pumps, hose, hydrants or valves as the case may be,

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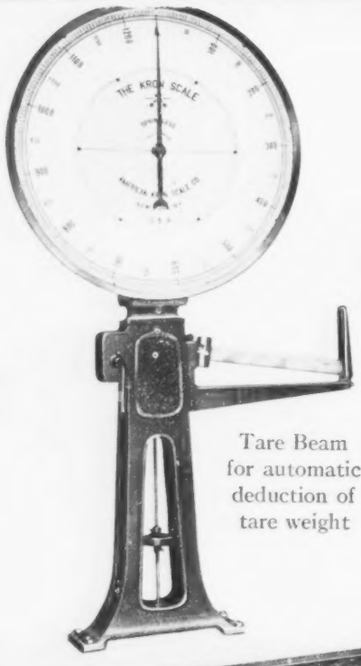

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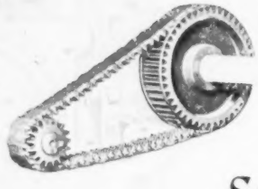

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and be held responsible for their being in proper condition and in operation without an instant's unnecessary delay.

Watchmen must be intelligent and able-bodied and be familiar with fire apparatus, including valves, etc. This job is no place for an unreliable or irresponsible man. As a check on their movements watchmen's clocks are provided. A combination of fire alarm system with that of the watch clock is most excellent, thus giving opportunity to sound a fire alarm from any watchman's station.

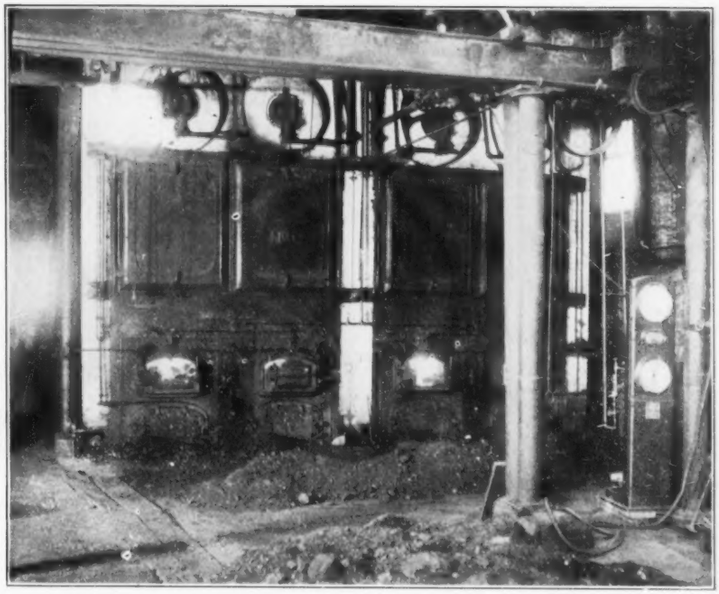
As a means of extinguishing the small incipient fires, small hose, fire pails or chemical extinguishers of various types are in common use and all factories should be provided with a supply of part or all as may be required to meet the conditions.

ENCOURAGING FEATURES OF WORK

There have now been outlined the main requirements for good factory fire protection; the details of these standards are covered in printed specifications prepared for the purpose of instruction and guidance of those desiring them, and they can be obtained without charge on application. The encouraging feature of all this work is, first of all that it has made the loss ratio of the Mutual Companies per hundred dollars of insurance carried the lowest of any insurance companies in the world, thus making possible lowest insurance costs.

Secondly, in the case of those who have been ready to avail themselves of the experience gained, it has almost entirely eliminated the possibility of serious and appalling disasters to life and property, with the consequential losses which are sure to follow.

Finally it has been of assistance in slowly but surely educating the great mass of our people to realize that "Safety First" is the source of a large part of the success of the individual, or the corporation, and as a direct result of this we now, through the operation of our compensation laws, are eliminating hazards other than those of fire, and by payments to employes are distributing the cost of injuries to them over the industry itself, in the same manner that broken and worn out machinery has been paid for in the past. This is now almost universally acknowledged to be equitable to both employer and employe if it is properly administered.



BOILER ROOM OF A NEW ENGLAND PLANT BEFORE OIL BURNING INSTALLATION

Oil Burners for Mill Power Plants

FUEL OIL has been used for many years from one end of the Pacific Coast to the other and throughout many of the Southern States in industrial plants for steam generating purposes. Coal for this purpose is rapidly disappearing in those sections of the United States where crude petroleum is a local product, and in the near future, according to present indications and in view of the increasing cost of coal, fuel oil will supersede coal in many of the large industrial establishments in the East, particularly in the New England States. This is evidenced by the fact that a number of large and representative concerns have already equipped their plants for oil burning after comparative evaporative and capacity tests which proved to them that oil is a more economical, powerful and satisfactory fuel than coal.

Among the large New England mills already using oil burners are:

The U. S. Finishing Co. Queen Dyeing Co.'s plant, Providence, R. I., containing 4 B. & W. and 2 return tubular type of boilers.

The American Woolen Co.'s Riverside mill, Providence, R. I., containing 17 Manning type of boilers.

The International Braid Co.'s Elmwood mill, Providence, R. I., 2 B. & W. type of boilers.

The Atlantic Mills, Providence, R. I., containing 31 Manning type of boilers.

The Jenckes Spinning Co., Pawtucket, R. I., 4 B & W. type of boilers.

The International Paper Co.'s Otis plant, Livermore Falls, Me., consisting of 16 Babcock & Wilcox type of boilers.

The International Paper Co.'s Rumford plant, Rumford, Me., which contains 12 Babcock & Wilcox type of boilers.

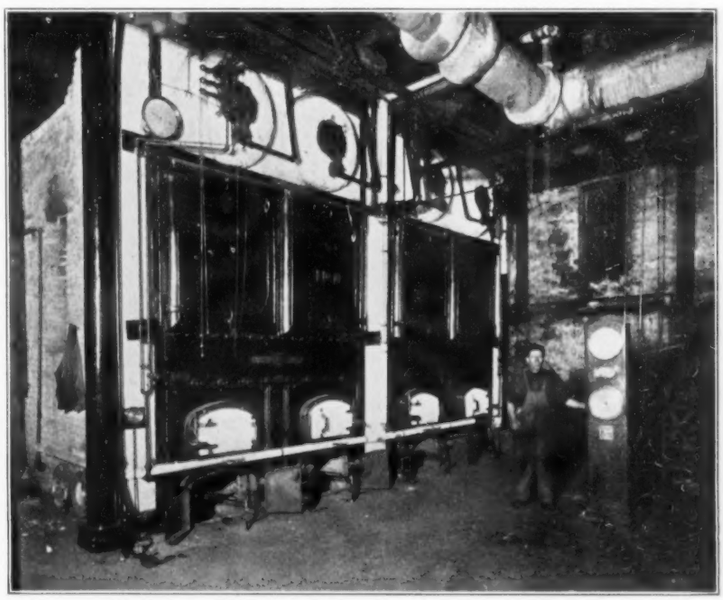
Besides the above, several other large installations are being made at this writing.

TEST AT QUEEN DYEING PLANT

A most exhaustive test of oil burning efficiency was made at the Queen Dyeing Co. of the U. S. Finishng Co., Providence, R. I. This plant consists of four Babcock & Wilcox and two return tubular type boilers. The test covered a period of 60 days with entire battery of boilers in service during the day and one boiler in service during the night. The portion of the test herewith reproduced is thoroughly illustrative, although it includes only 14 days. The averages at the end of the 60-day run are practically identical with the averages for this shorter period. For the total run the average evaporation from and at 212 degrees Fahr. per pound of oil is 15.46 pounds of water, whereas for the 14-day period herewith offered the average is 15.76 pounds.

Besides the high efficiency obtained it will be noted by referring to test data that the boilers were operated at considerable overloads during periods of the test. The oil furnished this plant averaged about 14 degrees Baumé, and the figures as given in tabulated form show conclusively the excellent results from an efficiency standpoint to be had with oil fuel, 80 per cent. combined furnace and boiler efficiency being averaged for the 10-day run.

At the Jenckes Spinning Co., Pawtucket, R. I., an equally interesting test



BOILER ROOM OF SAME PLANT AFTER OIL BURNING INSTALLATION, SHOWING GAIN IN CLEANLINESS AND SPACE

Date of test, 1915	Sept. 13	14	15	16	17	18	19	20	21	22	23	24	25	26	Average
Test number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	.....
Duration of test	24	24	24	24	24	5	43	24	24	24	24	24	5	43	24
Steam pressure	76	79	77	76	76	83	69	77	77	77	77	77	80	.....	77
Temperature of feedwater	162	159	163	166	163	152	172	151	150	146	140	139	127	.....	153
Fact of evaporation	1.087	1.090	1.087	1.083	1.087	1.099	1.075	1.098	1.098	1.100	1.119	1.110	1.124	.....	1.096
Temperature of flue gases	459	453	460	422	469	433	...	446	451	471	455	460	460	.....	453
Draft in rear pass	.05	.05	.05	.04	.05	.05	.04	.05	.05	.05	.05	.05	.05	.....	.05
Carbon dioxide	....	12.0	12.8	13.1	13.7	13.2	...	13.2	13.3	13.3	13.7	13.6	13.8	....	13.2
Smoke	No smoke during entire period.														
Position of ash pit doors	Doors wide open on all boilers.														
Total water actually evaporated	612,100	675,656	715,054	669,043	680,261	225,355	.....	746,777	783,430	831,342	824,316	832,126	239,080	....	652,203
Total water evaporated, F. and A., 212° F.	665,352	736,365	777,264	724,574	739,447	247,665	.....	819,960	860,266	914,476	914,991	923,660	268,726	....	716,057
Water per hour evaporated, F. and A., 212° F.:															
Day	51,775	55,408	56,770	56,833	45,507	49,041	.....	49,957	56,833	57,750	55,269	55,963	53,188	....	53,691
Night	9,129	11,445	13,985	13,500	15,000	.....	.....	9,166	9,166	12,475	14,377	9,250	.....	....	11,749
Steam pressure to burners	56	56	56	55	55	55	55	55	55	55	55	55	55	....	55.2
Oil pressure to burners	48	40	44	45	45	45	45	45	45	45	45	45	45	....	44.7
Temperature of oil to burners	124	126	127	121	130	130	130	130	130	130	130	130	130	....	128.3
Total oil as fired	43,575	47,302	50,412	46,872	47,070	15,750	27,394	53,633	56,362	60,097	59,205	60,420	16,965	....	45,004
Boiler H.P. (rating):															
Day	1,294	1,294	1,294	1,294	1,294	1,294	250	1,294	1,294	1,294	1,294	1,294	1,294	....	1,294
Night	250	375	492	340	490	.....	.....	250	250	250	354	250	.....	....	330
Boiler H.P. developed:															
Day	1,500	1,605	1,640	1,650	1,320	1,425	.....	1,450	1,650	1,675	1,600	1,620	1,540	....	1,556
Night	281	352	431	416	461	.....	.....	282	282	384	442	284	.....	....	361.5
Per Cent:															
Day	116	134	127	128	102	110	.....	119	128	129	124	125	119	....	122
Night	114	94	87	123	94	.....	.....	113	113	153	125	114	.....	....	110
Water evap., F. and A., per lb. oil as fired	15.23	15.57	15.42	15.48	15.71	15.73	.....	15.29	15.26	15.22	15.45	15.29	15.84	....	15.45
Water evap. per lb. oil, F. and A., 212° F., corrected for m't'r error	15.53	15.88	15.73	15.79	16.02	16.04	.....	15.60	15.57	15.52	15.76	15.60	16.15	....	15.76

Evaporative tests made at the Queen Dyeing Co. of the United States Finishing Co., Providence, R. I. Total capacity of plant 1,294 boiler horsepower; consisting of two 260 H.P. B. & W. boilers, two 250 H.P. boilers equipped with two Hammel Patent furnaces and two Hammel Patent burners each, and two 157 H.P. Bigelow H. R. T. boilers, equipped with one Hammel burner each.

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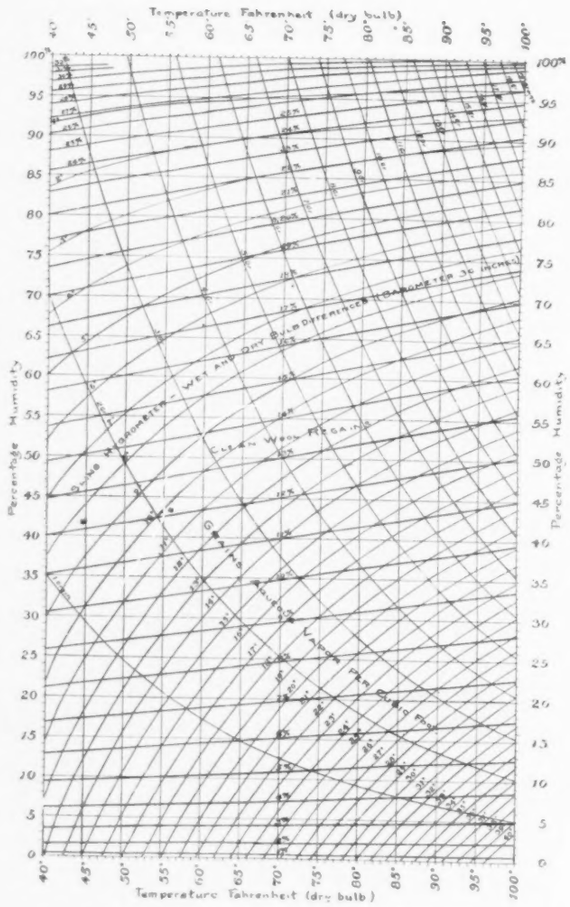
Hartshorne's Unit System Charts

WOOL Chart W 1



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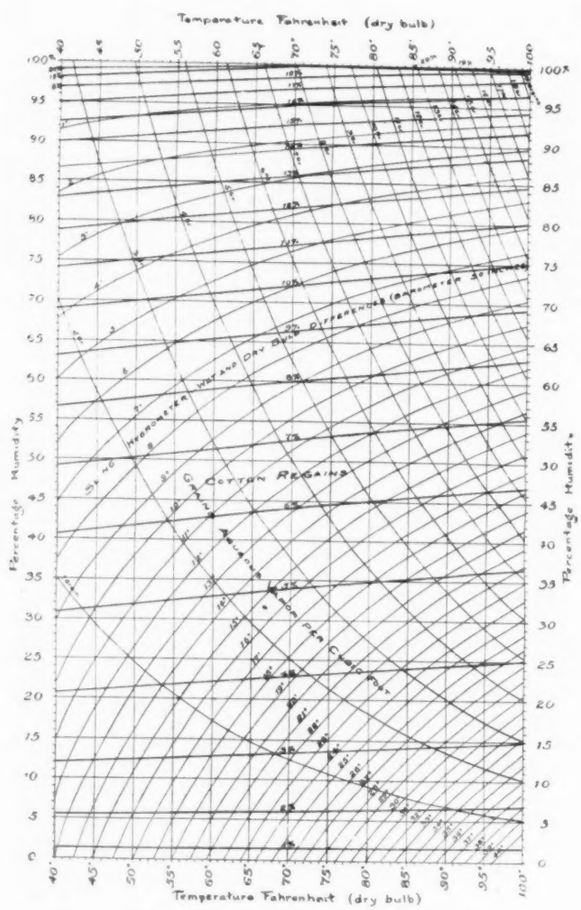
COTTON Chart C 1



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WILLIAM D. HARTSHORNE

Consulting Engineer

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was recently made covering a period of two weeks, and the average evaporation obtained was 14.7 pounds of water per pound of oil.

ADVANTAGES OF OIL AS FUEL

As a fuel oil offers a number of advantages over coal, which may briefly be summarized as follows:

General cleanliness due to the absence of coal dust and ashes. The boiler room may be kept as clean and as neat as anyone could desire. The two photographs herewith reproduced illustrate this advantage, one of them being taken while coal was being used and the other after the plant had been changed over to oil.

Higher boiler efficiency, due to a more perfect combustion with less excess air and the more even distribution of heat.

Increased steaming capacity; because of the intense heat generated boilers can be safely operated anywhere from 80 to 100 per cent. beyond builder's rating, whereas with coal as fuel many plants find it difficult to develop power even up to the builder's rating.

Smoke can be entirely eliminated if the least degree of intelligence is exercised in operating the equipment, even when boilers are being operated at maximum capacity.

Saving in labor; oil does away with the necessity of coal passers, ash removers and the army of firemen required in large plants where coal is used, as one man can readily handle eight to ten oil-fired boilers.

When the rules of the National Board of Fire Underwriters are followed in the installation of oil burning systems, the fire insurance rates are in no way affected.

Changing over from a system of coal burning boilers to oil equipment is a comparatively simple process. It involves practically no reconstruction of the boiler housing proper and in the simplest terms is merely the substitution of oil burners for the coal grates, though in addition to the burners there is the supply system which consists of oil storage tanks, oil pumps and the necessary piping. In this piping is included the filling line entering the tanks, the suction line from the tanks, the return line, oil line to burners and steam lines to burners, pumps and heater coils in storage tank. The fact that the storage tanks for oil are placed under ground is vital in saving space for the mill inasmuch as all the room previously used for coal storage then becomes available for other purposes, and in most instances this amounts to saving of large and useful space. The oil pump is a comparatively small machine, room for which can readily be found in the boiler room, or if preferred it may be put in a small shed outside the boiler house. A typical pump set is illustrated.

DESCRIPTION OF OIL BURNER

The vital part of any oil burning system is the burner, and of the burners in use at the present time there are in general two classes, outside mixer burners and inside mixer burners. In the outside mixer the steam issues from a slot or row of holes below similar orifices through which the oil is delivered. The oil flows into the steam jet and is atomized in such a way as to permit rapid combustion. The atomizing, however, is done completely outside of the burner. The inside mixer type provides a chamber into which both the oil and steam jets empty, the atomizing taking place here and only the atomized mixture issuing from the nozzle of the burner itself. The heavy hydrocarbons are completely separated into spray and the light hydrocarbons vaporized by the heat and force of the steam jet. The

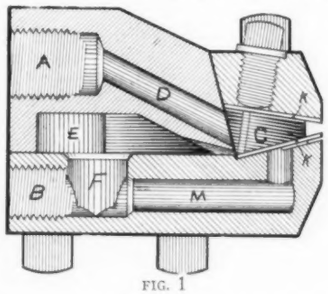


FIG. 1

burner made by the Hammel Oil Burner Equipment Co. and installed in the mills mentioned above, is a good example of this latter type, and the accompanying illustrations diagram its appearance and action. The oil enters at A, flows through D into the mixing and atomizing chamber C. The steam enters at B and flowing through condensing chamber E enters C through three small slots, G, H and I. The passage M acts as a steam separator and condensation entering with the steam is discharged through M under the lower plate. It is claimed for these burners that they will handle coal tar with the same success as they do oil.

In these illustrations Fig. 2 is the appearance of the burner-head from the outside, Fig. 1 gives a vertical cross-section from front and rear and Fig. 3 a horizontal cross-section. Fig. 4 shows the complete burner set. The line from the oil storage tank enters through the connection at the lower left-hand corner of the cut and the steam through the

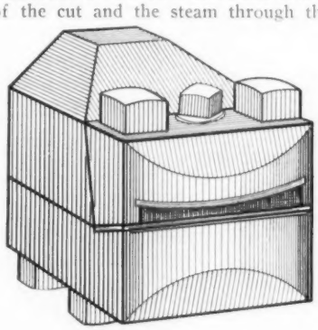


FIG. 2

connection at the top slightly left of center. The hand wheel on the left controls the by pass valve. The burner-head itself is on the right.

STEAM CONSUMPTION

Numerous tests have shown that the burner consumes only 2 per cent. or less of the steam generated by the boiler, and in a series of tests at the Queen Dye Works the entire system, including pumps and burners, consumed only 2.7 per cent. of the steam generated. As all oil is to some extent gritty, its passage will cause wear on some part of the burner, and to allow for this the Hammel burner is equipped with removable plates (K), which can easily be replaced and the burner made as effective as when new. Experiments have been made with burners having openings of large areas, thus offering small resistance to the passage of dirt, which can be operated at a very low maintenance cost, but these as a rule consume more than 3 per cent. of the total steam generated, a consumption which offsets the apparent economy in upkeep. On the other extreme burners with exceedingly small passages have been tried out, which economize on steam, but are likely to become obstructed and to require frequent replacement. It is believed that the Hammel burner now in use is between these two extremes and reaches an economical balance between steam consumed and maintenance cost.

In a battery of boilers equipped with oil burners variations in load can be taken care of with unusual simplicity. The practice in a number of plants using this equipment is to run all but one of the boilers at a fixed horsepower, manipulation of the odd boiler being sufficient to allow for normal variations. Each burner is equipped with a valve controlling the intensity of the flame, and by adjustment of which boilers can be run from their minimum to maximum capacity with little trouble or fixed at any desired point. Boilers with rating of from 1 to 600-h.p. require from one to three burners, and with this equipment can frequently be operated at an overload

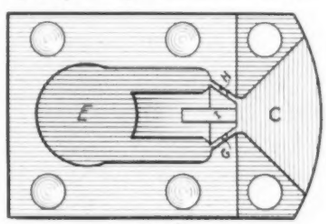


FIG. 3

of twice their rated capacity. In dealing with the problem of starting up an oil burning system when cold all that is necessary is a 1-h.p. donkey boiler, which will provide sufficient steam to heat the oil, operate the pumps and atomize the oil at the burners. When the system is in operation this boiler may be cut out. Under running conditions exhaust steam is used to heat the oil in the storage tanks by flowing through coils suitably arranged. Tests made on the Pacific Coast show that oil having a specific gravity of about 13 will give most satisfactory results when heated to 80 degrees Fahr. On increase of the temperature of the oil in the reservoir tank to 120 degrees Fahr. the efficiency of the boiler dropped considerably. Apparently the excessive heating causes decomposition of the hydrocarbons.

THE OIL SUPPLY

One of the factors in the delay in the adoption of oil burners in the East has been the high cost of fuel oil. This has of late been changed and with the larger supply of fuel and its lower cost, oil burning machinery is meeting with more ready adoption. The oil available in the East comes chiefly from Mexico. American interests possess large tracts of oil lands in that country from which an unlimited supply can be obtained. The fact that one company alone is reported to have spent several million dollars lately for storage and distributing facilities, is an indication of the trust these companies have in the future of their business. Excellent facilities are now at the disposal of New England manufacturers and the chief distributing points as at present developed are: Providence, R. I., Portland, Me., and Boston. One of the large companies controlling oil fields in Mexico is said to hold at the present time 12,000,000 barrels in earthen storage and to possess in its fields hundreds of capped wells. A capped well is one whose flow is so bounteous that an oversupply results and the wells are capped to hold the oil in check for future need. A large fleet of tankers is already owned by the various oil companies, and more vessels are building which will be placed exclusively at the service of the New England trade.

Mexican oil is one of asphalt base, averaging 13 degrees Baumé and having a heat value of 18,300 B.T.U.'s per pound. The fact that this oil contains no valuable by-products should be an influence in holding its price at comparatively low level. Those in the business state that it is of chief value for fuel alone. Most of the oils gathered from the fields of the United States and elsewhere are of paraffine base, and

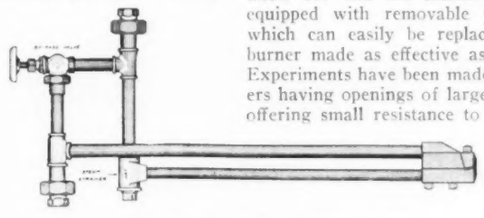
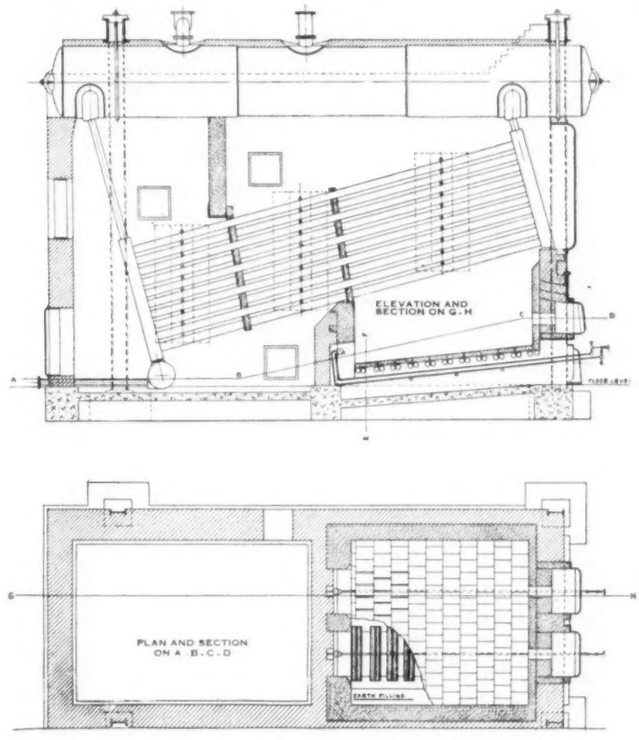


FIG. 4. OIL BURNER



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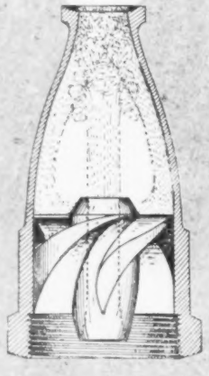

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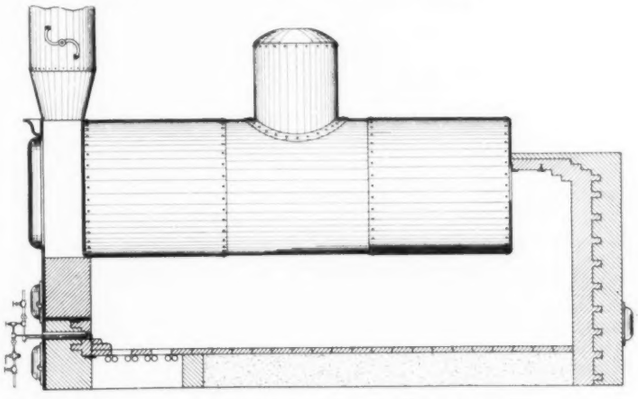
these run high in value of by-products, such as gasoline, naphtha, kerosene, etc.

HAMMEL FURNACES

The Hammel Oil Burner Co. has produced a special furnace for burning oil under steam boilers which has been found to be of great value in efficient operation. Much experimenting has shown the value of firing from the bridge wall forward toward the boiler front in the B. & W. type water tube boilers, and these furnaces are so arranged, as shown in the accompanying diagram. Tests have shown that these boilers can be operated with this furnace with considerable increase in capacity and economy and without smoke or the burning of tubes. A Hammel furnace has also been developed for use with return tubular boilers, and it is illustrated with the burner in position just inside the front wall. It will be noted that this furnace contains no checker work, bridge walls or flash walls of any kind, which reduces the cost of furnace upkeep to a minimum. The furnace volume and depth obtained permit a perfect combustion of the fuel before the gases come in contact with the heating surfaces. Boilers equipped with this furnace can be forced to develop more steam without injury to boiler than is usual with other arrangements.



HAMMEL FURNACE FOR FIRE TUBE BOILER

ELECTRIC POWER

(*Continued from page 239*)

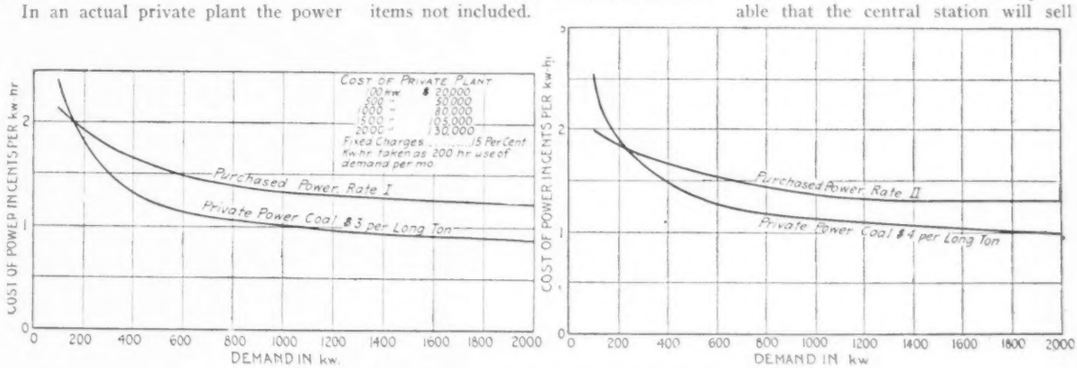
lem to be decided on its own merits, and the correct solution can be assured only by a correct evaluation of all the various technical and financial factors involved. This paper purports to give an unbiased statement of the factors which affect the relative merits of private and purchased power for the textile industry.

PRIVATE AND PURCHASED POWER

Rather than center upon a theoretical discussion to determine what purchased power ought to cost, it will give a truer understanding of the matter to consider only what it actually does cost. Figs. 1 and 2 give the cost of purchased power for ordinary textile mill conditions for any load up to 2,000 kw. These curves are plotted from the published schedules of public service corporations, one in New England and one in the Middle West. While rates as good as these cannot be obtained in all localities, still these are actual and representative rates. For comparison, the cost of private power has been plotted, using in each case the price of coal obtainable in the district served. The cost is for power delivered at the point of distribution at 550 volts in all cases. No provision is made for use of steam other than for power, and where such use is considerable, the relative cost of private power may be much lower than given. This factor is important and will be treated separately. While the cost of purchased power given is actual, the cost of private power is theoretical, and is not intended to give more than an approximate and general comparison, but is based on known actual conditions.

In an actual private plant the power cost very often exceeds that given. The investment as stated is too low to cover any reserve or relay capacity, and therefore the reliability must be considered somewhat inferior to that of those central stations which were used for this comparison. Also, the investment will not take care of any disadvantageous conditions, such as expensive foundations or difficulty in obtaining condensing water; and no cost items are included for land or for coal in storage. All of these items are too indefinite to be included in a general cost estimate, but are always encountered to some extent. The operating costs assumed, while no better than should be obtained, are really somewhat lower than the average. Nothing has been included for supervision other than the actual power plant labor, but this supervision is usually a legitimate item of expense.

The average yearly saving of the private plant, 500 kw. in size and over, from the above curves, is about 9 per cent. of the cost of the plant. The highest value is 12 per cent. for the 2,000-kw. demand. Therefore, the private plant under ideal conditions can compete favorably with the power rates given, but the margin is not large and must cover several indeterminate cost items not included.


COST OF POWER IN CENTS PER kw-hr
DEMAND IN kw.
Cost of Private Plant
100 kw. $ 20,000
500 " 50,000
1000 " 80,000
1500 " 105,000
2000 " 130,000
Fixed Charges.....15 Per Cent
Kw-hr. taken as 200 hr use of demand per mo.
Purchased Power, Rate I
Private Power Coal @ 3 per Long Ton
Purchased Power, Rate II
Private Power Coal @ 4 per Long Ton

FIGS. 1 AND 2. RELATIVE COST OF POWER FOR LOADS UP TO 2,000 KW.

The central station rates quoted apply to any industrial plant. A textile mill load is properly considered somewhat more favorable than the average industrial load on account of its very steady demand for power, not only throughout the working period of each day, but also throughout the year and over a period of years. For this reason, special power rates can be obtained by textile mills in some localities, notably in the South, and to some extent in New England. Under these special rates, power usually costs about 1½c. per kw-hr. for demands from 1,000 to 2,000 kw. and about 1c. above 2,000 kw. Such rates leave little financial inducement for the mill to build its own power plant.

SIZE OF PLANT AND RELATIVE COST

It will be seen that the curves for purchased and private power, Figs. 1 and 2, are very nearly parallel. This means that the size of the demand has little effect on the relative cost. The larger plants show a slightly larger proportional saving than the smaller ones, and the very small plants—under 200 kw.—cannot compete with the purchased power rates given.

EFFECT OF LOAD FACTOR ON RELATIVE COST

Figs. 3 and 4 have been prepared from the same data as Figs. 1 and 2, to show the effect of load factor on the cost of power in the case of a 1,000-kw. demand. It will be seen that the curves for private and purchased power costs follow the same general direction. It appears, then, that load factor also has little effect on the relative cost of power. There is a striking similarity between the curves shown for private and purchased power, both when the variable is the size of the demand and when it is the load factor. The inference is that these power rates were devised to compete with isolated plants rather than from actual costs, or desired rates, of the central station power. This is entirely logical, being simply an application of the law of supply and demand. If it be true that the cost of central station power is determined by the cost of generating in isolated plants, then it will be unnecessary to discuss further the relative cost. It is improbable that the central station will sell cheaper than the average isolated plant cost, and if its rates are very much higher, it cannot sell much power. This, of course, applies only in the case of new plants, where power can be purchased without any sacrifice of existing investment, and where steam is needed only for power. Also, it must be remembered that the individual plant may depart widely from the average.

All that has preceded is a comparison of purchased and private power where the private plant is not yet built. But, in the case of a going plant, the purchase of power would save operating expense only, and would not wipe out fixed charges on investment already made. Fig. 5 shows the cost of private and purchased power, as in Fig. 1, but without including fixed charges. This, then, is a comparison between purchased power and a going plant under good working conditions. The difference in cost is so great that it appears improbable that central stations can cause existing plants to shut down unless in the case of important changes or additions, or the necessary renewal of considerable apparatus, or because of extremely poor operating economy.

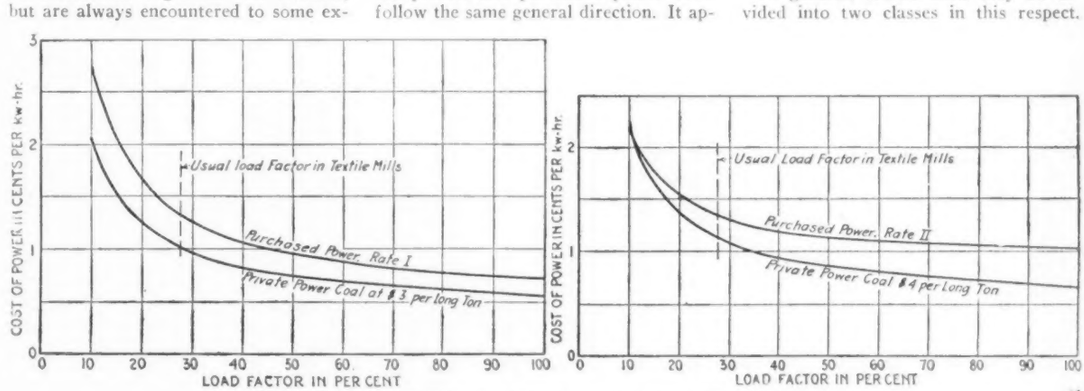
EFFECT OF STEAM ON COST OF POWER

Every textile mill uses some steam for heating and manufacturing. This factor is of great importance, and should always be weighed accurately in considering purchased power.

In general, textile mills may be divided into two classes in this respect. The first contains those mills using only a relatively small amount of steam in manufacturing, and includes most silk and knitting mills and cotton and woolen mills not engaged in scouring, bleaching or finishing. Dye houses, finishing mills, print works, and textile mills which finish their product, are included in the second class, and have a large but variable demand for steam in the process.

LIVE STEAM IN SLASHERS

Slashing may be taken as typical of a


COST OF POWER IN CENTS PER kw-hr.
LOAD FACTOR IN PER CENT
Usual load Factor in Textile Mills
Purchased Power, Rate I
Private Power Coal at $3. per long Ton
Purchased Power, Rate II
Private Power Coal @ $4 per Long Ton

FIGS. 3 AND 4. RELATIVE COST OF POWER FOR LOAD FACTORS 10 TO 100 PER CENT.

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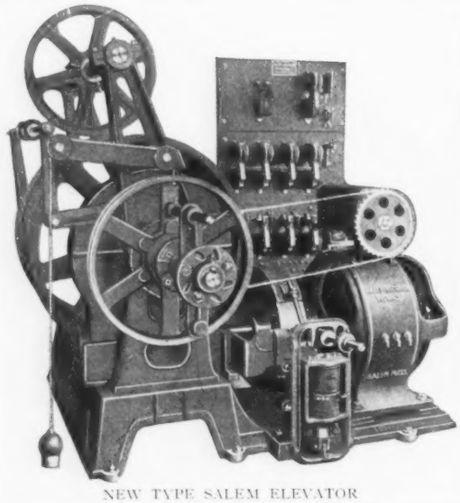

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small demand for manufacturing steam. Very often exhaust steam is used in this process. The pressure desired varies from 5 to 12 pounds, which is a suitable pressure to bleed from an engine receiver or bleeder turbine. Only in rare cases would it be economial to run non-condensing apparatus to supply slashers on account of the high back pressure required and the relatively small demand. In the case of a bleeder turbine, the saving in live steam amounts to about 30 to 40 per cent. of the steam bled. This saving is reduced by additional fixed charges on extra cost of turbine and exhaust piping, for a relatively small service, and, in a large plant with a long run of pipe, may be negative. For a rough figure, applicable to average conditions, the gross saving will be about $200 per year for each 1,000 pounds per hour bled, with coal at $4 per ton. This figured out about $0.0001 per kw-hr. in the case of a large cotton mill, or about 1/50 of 1 per cent. of the cost of production. While there is no doubt that exhaust steam can be and is successfully used in slashers and similar machines, still live steam at reduced pressure has a tendency to reduce operating difficulties and increase production. When exhaust is used, there are apt to be occasional periods when results are not satisfactory, due to a temporary drop in pressure or excessive condensation or to adverse atmospheric

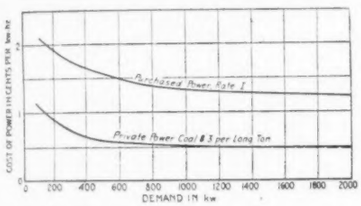


FIG. 5. RELATIVE COST OF POWER, WITHOUT INCLUDING FIXED CHARGES

conditions. If live steam is used, it is fed to the slasher in a dry or even superheated condition, and this, together with the perfect flexibility in control of pressure, obviates most of these difficulties. Where a saving is relatively so minute, the wisdom of obtaining it at the cost of even a small operating handicap is fairly questionable.

ANALYSIS OF HEATING REQUIREMENTS

As regards steam for heating, there are two factors, often ignored, which militate against the use of exhaust in textile mills, especially in cotton and woolen mills. One of these factors is the large amount of heat liberated from the machinery during working hours, and the second is the diversity in time between the use of power and the use of steam for heating. Table 1 shows the amount of heat required to warm each room in a large cotton mill in zero weather, and also in 35-degree weather, which may be taken as an average during the heating season, and also the heat liberated from machinery in each room. It is assumed that all the power used in cotton machinery is dissipated as heat.

The mill chosen for this example is in northern Massachusetts, and has a very large window area and a saw-tooth weave shed. The heating requirements are certainly much more severe than the average. Yet, even in this case, the machinery provides more than half of all the heat required in zero weather, and for much of the heating season no extra heat whatever is needed during working hours, except in the storehouse and basements. In a mill of this kind, the heat is usually turned on at 4 or 5 A. M. to get the mill warmed up before starting time, and is turned off sometimes as early as 9 A. M., and sometimes not at all, depending on the weather. In a weaving mill in northern Massachusetts, where the power used per cubic foot of space is much less than in a balanced mill, the heating system was actually in operation only 25 hours per week average during working hours during the heating season, or about one-quarter of the entire yearly operating time of the mill. Of course, all heat used outside of working hours—nights and week-ends—must be live steam. If exhaust is to be used the rest of the time, as a general rule, it is proper to count on a demand only about one-half of the maximum, since the machinery provides the remainder, and this quantity probably will not be used more than 700 hours per year. The only way to meet a demand for exhaust of this character with economy is by bleeding from an engine or turbine. In a cotton mill cited above, bleeding steam for heating would effect a saving amounting to $0.00005 per kw-hr., a little less than in the case of slashers. In knitting and silk mills, the saving will be relatively greater, but in warmer climates much less.

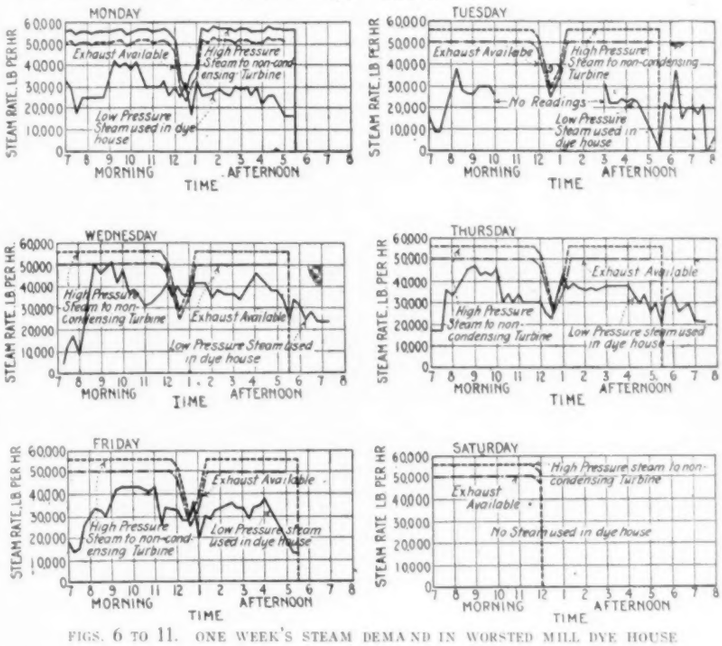
SMALL ECONOMY IN USING EXHAUST

It appears, then, that the coal saving effected by using exhaust steam for heating and slashing is very small—smaller, in fact, than the unavoidable errors in estimating the total cost of power. There is, however, some further saving due to economy in investment. It is apparent from the foregoing that if steam for these demands is bled, the extra boiler capacity necessary to meet them is reduced approximately one-half. Also, it is cheaper to get this extra boiler capacity as part of a larger plant built for power generation than to provide it in a separate plant by itself as would be necessary if power were purchased. This matter was investigated in the case of a fairly large cotton mill. It was found that the complete power plant would cost $65.00 per kw., but if the cost of an independent steam plant for heating and slashing were deducted, the cost would have come out about $58 per kw., this latter being the figure used in comparison with purchase power. While it is entirely unsafe to apply average figures to individual cases, it is desirable to form a clear conception of the relative importance of the various factors, and we may say that, in general, the entire fuel and investment saving due to the bleeding of steam for heating and slashing will range from $0.0005 to $0.0010 per kw-hr. A saving of this size cannot have a very important influence on a decision for or against purchased power. Nevertheless, the matter should always be considered.

CENTRAL STATION CANNOT COMPLETE

A very different result is obtained in those mills having a large demand for steam for boiling water and drying cloth. In such cases, a large proportion of the prime mover exhaust may be utilized. In some cases, all power is produced in non-condensing apparatus, and all exhaust utilized, and manufactured power becomes then so cheap that no central station can compete. It is seldom, however, that a textile plant can utilize all of its exhaust all the time. This is because of diversity in time and amount between the use of steam and use of power. The importance of this can be shown by citing an actual case.

Figs. 6 to 11 give curves showing the demand for steam in a worsted mill dye



FIGS. 6 TO 11. ONE WEEK'S STEAM DEMAND IN WORSTED MILL DYE HOUSE

house for one week's operations. These curves are plotted from actual flow meter readings in exhaust main, which were taken every fifteen minutes. In this case the exhaust was provided by a non-condensing turbine. For comparison, the steam fed to the turbine was measured on one day and plotted. For the other days, the steam to turbine was averaged from the kilowatt-hour readings. The curves show how the demand for steam varies from hour to hour and day to day, and also lags behind the power load. The demand for steam in a dye house is light early in the forenoon, but persists for two hours or more after the mill is shut down. The dye house does not run at all on Saturday mornings, which is a custom not uncommon. The result is a very large surplus of exhaust which must be wasted, and in spite of this, considerable live steam make-up is required, as shown by the curves. It is obvious that such conditions result in great inefficiency. Actually less coal would have been burned if a standard condensing turbine had been installed and live steam exclusively used in the dye house. The expected result of this installation was that power would be furnished as a by-product at a purely nominal cost. The actual result was that the power cost was considerably higher than in a plant having no use for steam in the process. This case is especially worthy of study because it is a typical balanced worsted mill of fairly large size doing its own dyeing; there were no special or unusual features involved; the installation was actually made, and the results as given were determined by careful tests.

WHY IT WAS UNPROFITABLE

The reasons and calculations leading to the installation of this non-condensing turbine are not known to the authors, but there is no reason to doubt that the installation promised to be very profitable. The total steam used in the dye house was considerably in excess of that to be supplied by the turbine, and it was apparently safe to assume that all exhaust would be utilized. With the turbine, there would be no trouble

(*Continued on page 317*)

Table 1. Cotton Mill Heating.

Building.	Contents.	H.P.	Heat Radiated from Building (Calculated), B.t.u. per Hour. 0 Deg.	35 Deg.	Heat Sup'd by Power, B.t.u. per Hour.*	Heat to be Supplied by Steam in Mill Hours. Zero W'ther.
Weave shed	Looms	1,628	8,550,000	4,275,000	4,140,000	4,410,000
Weave shed basement	Storage		980,000	490,000		980,000
Mill, basement	Storage		1,550,000	775,000		1,550,000
Mill, 1st floor	Picking, Carding, Roving	660	1,900,000	950,000	1,680,000	220,000
Mill, 2nd floor	Picking, Carding, Roving	647	1,900,000	950,000	1,650,000	250,000
Mill, 3rd floor	Filling, Spinning, Warp Spinning	691	1,900,000	950,000	1,760,000	140,000
Mill, 4th floor	Spooling, Warping	1,378	2,900,000	1,450,000	3,500,000	
Storehouse	Storage		1,800,000	900,000		1,800,000
Total			21,480,000	10,740,000	12,730,000*	9,350,000

* Assuming all power transformed to heat.

American Specialties in Ireland

(*From Commerce Reports.*)

Agricultural machinery is a large trade, meeting the famous British machinery in a market which was formerly a sort of British preserve. Tools and wooden handles are a good line, and builders' tools of all descriptions from America are constantly sold as being the best obtainable. American shoes are sold for their smart appearance, and one of the largest shoe stores in Munster sells mainly British shoes which purport to be American, to take advantage of the American reputation. American typewriters, gramophones, kodaks, and sewing machines here, as throughout the world, find ready and regular sale on their merits, although they can not be located in the official statistics.

American cotton underwear, fleece-lined, is in great demand among the rural classes, and this trade is of sufficient importance to be better handled than at present, as price-cutting by brokers has forced retailers to carry it on a nonremunerative basis. American hardware of all classes is well regarded, and it is handled in large quantities in competition with hardware from Bradford and other British centers and from Germany prior to the war. Canned fruits, pickles, baking powder, etc., from the United States have an ample share in the grocery trade here

Leading Textile Machinery Manufacturers Use S.K.F. Self-Aligning Ball Bearings

PARTIAL LIST of S.K.F. USERS

ON WOOLEN MACHINERY

Hubbard Machine Co., Worcester, on Cards, Comb Boxes and Pickers

C. S. Dodge, Lowell, on Shoddy Pickers

Curtis & Marble Machine Co., Worcester, on Shoddy and Burr Pickers

Smith & Furbush Machine Co., Phila., on Shoddy Pickers and Garnetts

James Hunter Machine Co., No. Adams, on Garnetts and Dryers

C. G. Sargent & Sons' Corp., Graniteville, Mass., on Dryers

Wm. Schofield Co., Philadelphia, Pa., on Pickers

Davis & Furber Machine Co., No. Adams, Mass., on Nappers and Pickers

Parks & Woolson Mch. Co., Springfield, Vt., on Nappers and Trademarking Machines

Saco - Lowell Shops, Lowell, Mass., on Shoddy Pickers

Philadelphia Tex. Machinery Co., Philadelphia, Pa., on Dryers

ON COTTON MACHINERY

Fales & Jenks Machine Co., Pawtucket, R. I., on Twister Spindles

Saco - Lowell Shops, Lowell, Mass., on Openers and Pickers

H & B American Machine Co., Pawtucket, R. I., on Pickers and Cards

Potter & Johnston Machine Co., Pawtucket, R. I., on Pickers and Cards

Hubbard Machine Co., Worcester, Mass., on Pickers, Cards, etc.

Universal Winding Co., Providence, R. I., on Special Type Winders

Atkinson, Haserick & Co., Boston, Mass., on Comber Aspirators

ON SILK MACHINERY

Atwood Machine Co., Stonington, Conn., on Silk Spinner

There is an interesting story back of every S.K.F. Ball Bearing that is used on Textile Machinery. They have been an important sales factor in helping to build up textile trade.

Different from the ordinary ball bearing, S.K.F. has two rows of Swedish Crucible Steel balls that automatically align themselves to the slightest shaft deflection or spring. This is a vitally important feature on textile machines, as it prevents any binding strains taking place in the bearing.

S.K.F. is a textile machine bearing, because it is absolutely clean, saves power, gives increased production, and reduces machinery upkeep costs.

Other features are described in Bulletin No. 14— "S.K.F. Ball Bearings on Textile Machinery." Send for it today and learn the simplest, most satisfactory way of solving your bearing troubles.

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SPECIFY S.K.F. BALL BEARINGS ON

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Pickers
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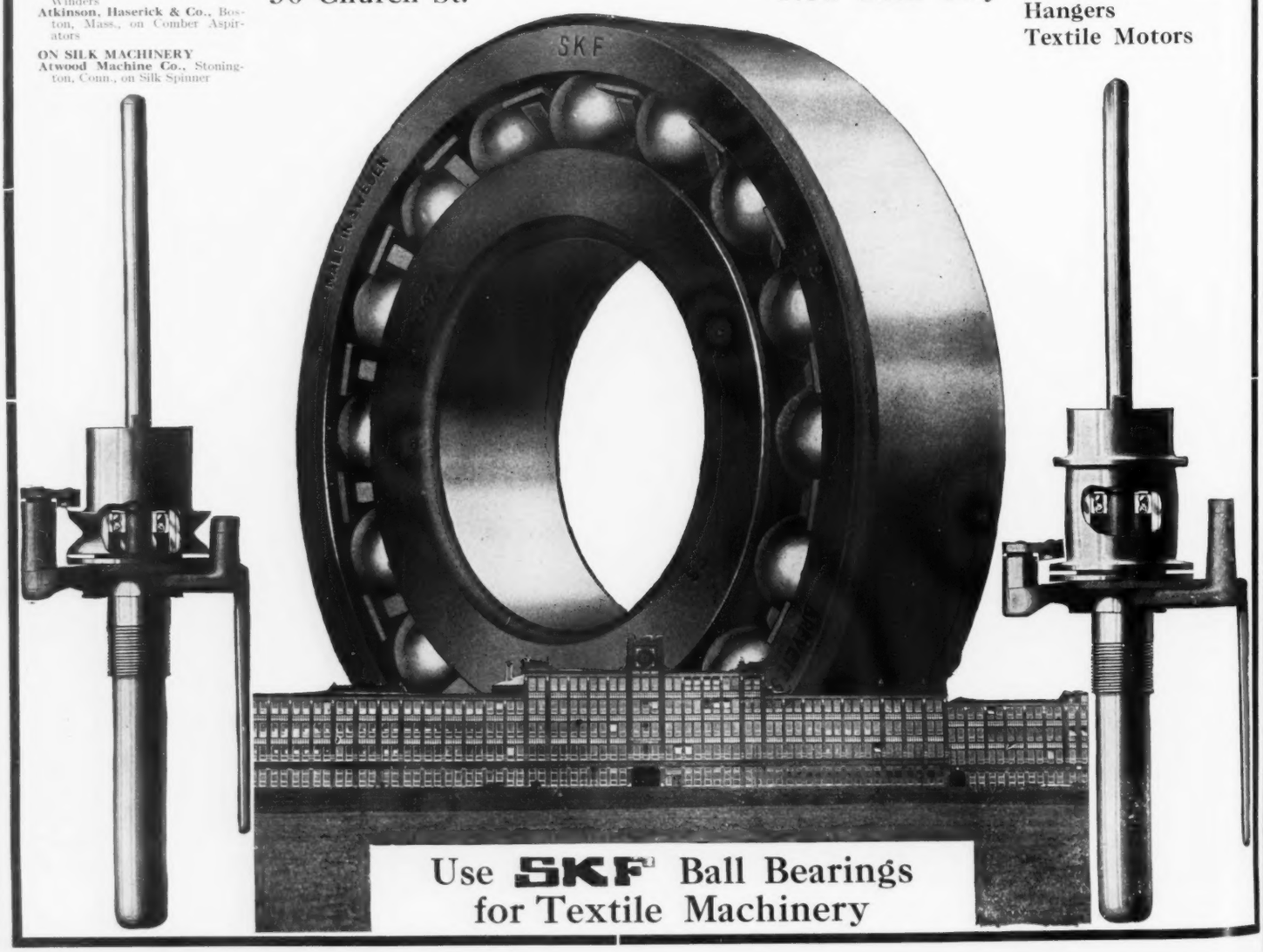


Use SKF Ball Bearings for Textile Machinery

Report of Mill Construction for 1915

Statistical Review of the Year

THE report of mill construction for the past twelve months reflects the uncertainties confronting the textile manufacturing industry during the early part of the year, when bewildering conditions prevented any large investment in new mills, where many months must elapse between planning construction and beginning production. In January the "Build Now" campaign and comparatively low prices of materials and machinery undoubtedly induced some new construction and replacement of old machinery, but during the first half of the year there were few new mills under construction or definitely projected.

This temporary halting in the normal growth of the textile industry has been largely offset by the great improvement in conditions during the past few months when manufacturers began to see prospects of not only a good home demand for goods, but also for gaining a substantial world trade. The total number of new mills for the year is 219, as compared with 245 for 1914, and an annual average of 260 for the nine preceding years. The low record for this period is 208 new mills established in 1911, and the high mark is 303 new mills in 1906. The cotton, wool and silk branches show a decrease from 1914 and the knitting industry makes a slight gain. The accompanying table gives a comparison of new mill construction for the past ten years.

NEW COTTON MILLS

With 24 new mills or separate large new departments for existing mills, totalling 351,272 spindles, the cotton industry makes a creditable showing. Of these six are in the New England States, 14 are in the Southern States, three in Pennsylvania and one in New York. In number of new spindles the South also leads, most of the new plants in other States being small specialty mills. The new mill of the Naumkeag Steam Cotton Co. at Salem, Mass., which is illustrated and described in detail in another part of this issue, is the largest development of the year and is a remarkable example of what can be accomplished by a textile organization that advertises as well as manufactures its products. The new White Mills of New Hampshire at Peterboro, which have rebuilt and re-equipped an old mill property to make colored cotton goods, is the only other spinning and weaving mill established in New England.

North Carolina leads the South with eight new mills with 106,000 spindles and 1,132 looms. Seven of the new mills will manufacture cotton yarns, ranging from the plant of the Highland Cordage Co. to the $500,000 combed yarn mill of the Rex Spinning Co. at Gastonia. Georgia reports three new mills with a total of 64,000 spindles and 900 looms. The duplication of the original plant of the Republic Cotton Mills at Great Falls, S. C., calling for 40,000 spindles and 1,000 looms, gives South Carolina third place.

There have been a large number of improvements made by the old-fashioned mills, replacing old equipment and balancing departments, showing a tendency to strengthen organizations. Notable examples in the South are the Avondale Mills at Birmingham, and the Coosa Manufacturing Co. at Piedmont, Ala.; the Eagle & Phenix Mills at Columbus and the Bibb Manufacturing Co., of Macon, Ga.; the French Broad Manufacturing Co. at Asheville, the Erlanger Cotton Mills at Lexington, the Thread Mills Co. at Spray, and several of the Cannon Mills in North Carolina.

Many New England mills also have re-equipped and extended departments, including the Renfrew Manufacturing Co. at Adams; Sagamore Manufacturing Co., at Fall River; Appleton and Tremont & Suffolk Mills at Lowell, Mass.; Amoskeag Manufacturing Co., at Manchester and Nashua Manufacturing Co., at Nashua, N. H.; Manville Co., Lawton Spinning Co. and Nyanza Mills at Woonsocket, R. I.

The heavy demand for tire fabrics is shown by the activity in this class of mills, one new plant being in course of construction and practically all the larger manufacturers of this line making increases. A comparison of spindles in new cotton mills for the past ten years is shown in the accompanying table.

COMPARISON OF SPINDLES IN NEW COTTON MILLS FOR THE LAST TEN YEARS.

	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.
New England	112,000	109,000	75,000	94,400	170,500	468,714	599,000	115,000	113,000	171,006
Southern States	239,272	136,172	250,760	437,000	172,000	214,028	527,528	91,193	294,745	294,956
Middle and Western	.....	.....	7,000	1,700	4,920	12,500	79,968	3,500	10,250	27,040
Totals	351,272	245,172	332,760	533,100	347,420	695,242	1,206,496	209,693	417,995	492,996

NEW WOOLEN AND WORSTED MILLS

Of the 19 new woolen and worsted mills, 6 are in New England, 9 in Pennsylvania and one each in California, Georgia, New Jersey and New York. Most of the new enterprises are small and of less importance than some of the changes and extensions made by old companies.

The year has been featured by the starting up of idle mills, partly as a result of war orders, and it is difficult to find a mill capable of manufacturing profitably without extensive rebuilding that has not been leased or purchased and put in operation. It is noteworthy that the American Woolen Co. has acquired another mill in Maine, besides making many important improvements and increases in its various plants, and that the Cleveland Worsted Mills Co. has added another mill in Philadelphia to its properties and constructed a number of additions and installed a large quantity of new machinery in its various mills.

The United States Worsted Co. has largely re-equipped and started up the Iroquois Mills at Saugus, Mass., after an idleness of many years. The Bigelow-Hartford Carpet Co. is bringing about manufacturing economies by building new mills at Thompsonville, Conn., and Clinton, Mass., and removing machinery from Lowell. Extensive rebuilding operations are under way at the Goodall Mills, manufacturers of Palm Beach cloth, and the Sanford Mills at Sanford, Me. Forstman & Huffman Co. and the Botany Worsted Mills of Passaic are making large additions. Amsterdam carpet mills are also preparing to increase their output.

NEW KNITTING MILLS

The knitting industry maintains its position as the fastest growing branch of the textile industries in number of new establishments. The 1914 record of new mills was surpassed, 111 new enterprises being established in 1915 as against 110 in 1914. The industry continues to concentrate in Pennsylvania, New York and New Jersey, these three states having 68 per cent. of all the new mills. Pennsylvania alone has 45 new knitting establishments against 14 for all the Southern States and 5 in New England. In the South the extension of existing mills is noticeable.

William F. Taubel, Inc., of Riverside, N. J., manufacturers of hosiery, made a large expansion, locating new branches at Camden, Millville, Trenton and Vineland, N. J., and at Lebanon, Palmyra and Reading, Pa. Important changes and enlargements have been made by W. B. Davis & Son hosiery mills at Fort Payne, Ala., and a new plant at Soddy, Tenn., has been added to the hosiery mills controlled by Garnett Andrews of Chattanooga. Several important increases by the Union Mills group of underwear and sweater mills are reported and many changes and important improvements are under way or have been completed in other New York and Pennsylvania mills.

The popularity of knitted outer apparel, the opportunities for bringing out novelties and the inventive ability of the knitting machinery manufacturers in producing equipment for manufacturing at reasonable cost more desirable and finer products, makes the outlook favorable for the continued growth of the knitting industry.

NEW SILK MILLS

Even more than in the knitting industry, silk mills tend to concentrate in New Jersey and Pennsylvania. Of the new silk mills approximately 90 per cent. are in that section. Among the noteworthy developments are the increase in the authorized capital of J. H. & C. K. Eagle to $20,000,000, and the establishment by this concern of new plants at Shamokin and Kulpmount, Pa., and Paterson; the building of a large new weaving mill at Hazleton and a 40,000-spindle throwing mill at Dorrancetown, Pa., by the Duplan Silk Co.; the expansion of H. R. Mallinson & Co., and the new plant of Katterman & Mitchell Co. at Port Jervis, N. Y. As in the woolen and worsted industry many idle mills have been reorganized and started up and there have been many small concerns started in the tenement mills of Paterson, taxing the large capacity of that city for manufacturing space.

MISCELLANEOUS NEW MILLS

Among miscellaneous mills, plants for bleaching and nitrating cotton and linters are more numerous than usual. It has been impossible to locate all of these mills owing to the secrecy surrounding their operation. Facilities for this work have also been added by several old established mills. The demand for absorbent cotton is larger than at any time in the world's history and equipment to manufacture the product and for finishing and putting up gauze and bandages has been installed in many mills. In spite of the scarcity of dyestuffs several new dye works have started and many dyeing, bleaching and finishing works have enlarged.

Despite many remaining adverse influences the hesitancy to expand has been succeeded by a determination to be prepared for future heavy domestic business, and among some classes of manufacturers, to take advantage of the new channels for export trade. Reports each week from all sections of the country show an increasing number of new mill projects, extensions and improvements being planned that indicate a remarkable record of new mill construction for 1916, if the period of prosperity upon which the textile trade has entered is sustained throughout the year.

The detailed report of new mills, important changes, enlargements and improvements follows:

COMPARISON OF NEW MILL CONSTRUCTION FOR LAST TEN YEARS.

	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.
Cotton	24	26	27	37	32	67	80	47	64	74
Wool	19	21	24	24	20	31	47	23	25	56
Knitting	111	110	142	122	92	113	105	94	83	103
Silk	25	51	54	46	38	34	37	33	51	36
Miscellaneous	40	37	30	36	26	29	20	25	39	34
Totals	219	245	277	265	208	274	289	222	262	303

Details of Mill Construction

NEW COTTON MILLS

Alabama, Fairfax. Fairfax Mill (West Point Mfg. Co.); Building spinning mill, 3 stories, 425 by 132 feet; weave shed, 325 by 132 feet. To manufacture Cotton Duck on 25,000 spindles and 500 looms; electric. (Begin manufacturing about March 1, 1916.)

Connecticut, Derby. The Derby Textile Co.; $25,000; Edwin B. Gager, pres.; Robert E. Morrey, treas., agent and buyer; Elastic and Non-Elastic Braids and Cords of all kinds; electric; sell direct; Buy 5/2 to 100/2 cotton and merc., also art. and tram silks and worsted yarn.

Georgia, Dalton. Crown Cotton Mills. Duck and Osnaburgs; built new No. 2 mill, including yarn mill, weave shed, warehouses and cottages; 15,000 spindles; 400 looms.

La Grange. Hillside Cotton Mills; $500,000; C. V. Truitt, pres.; S. Y. Austin, vice-pres. and gen. mgr.; Fuller E. Callaway, treas.; 8s to 24s Cotton Yarns; built new 3-story mill, 315 by 132 feet; 21,000 spindles; J. H. Lane & Co., New York, selling agents.

Thomaston. Thomaston Cotton Mills, Sheetings, Ducks, Drills and Yarn; built new mill, 400 by 125 feet; adding 28,000 spindles and 500 looms.

Massachusetts, Lawrence. Shawsheen Co.; William Whitman; Heavy Cotton Fabrics; building new 2-story mill, 600 by 100 feet.

Rockland. Peerless Rug Co.; F. C. Keene and E. B. Peterson, props.; Colonial Wash Rugs, Rugs from Old Carpets.

Salem. Naumkeag Steam Cotton Co.; Sheetings, etc.; built new spinning mill, new weave shed and new office building; 100,000 spindles; 2,600 looms; electric.

New Hampshire, Peterboro. White Mills of New Hampshire; Denims; dye and finish; water. Old Union Mfg. Co. buildings taken over by White Bros. of Winchendon and White Valley, Mass., and E. Jaffrey, N. H., and equipped with 12,000 spindles, 400 looms, dyeing and finishing machinery, etc.

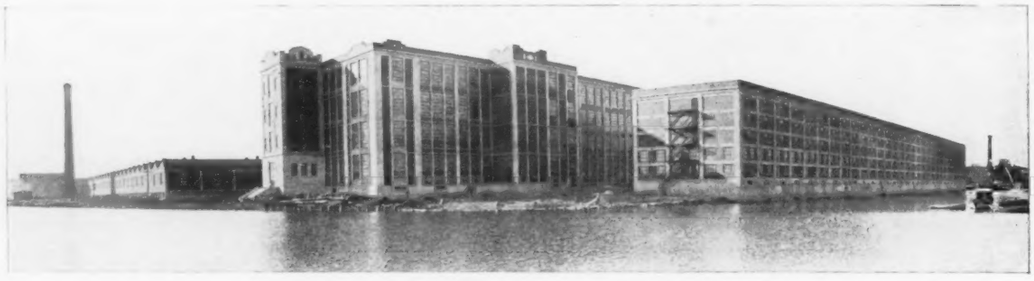
New York, Auburn. Cayuga Linen & Cotton Mills, Inc.; $12,000; W. E. Penny, pres., mgr. and buyer; H. L. Ferris, treas.; Flax, Linen and Cotton Twines; 500 spindles; electric; sell direct.

North Carolina, Belmont. Climax Spinning Co.; $300,000; A. C. Lineberger, pres.; S. P. Stowe, treas.; Combed Yarns; electric; building new mill 520 feet long by 125 feet. (Expect to begin manufacturing about October, 1916, with 21,760 spindles.)

Charlotte. Robinson Mfg. Co.; $100,000; W. L. Robinson, pres.; W. E. G. Robinson, vice-pres. and sec.; W. A. Watson, treas.; 10s to 18s Hosiery Yarns; 7,500 spindles; electric; sell direct.

Concord. Norcott Mills Company; $175,000; C. W. Johnston, pres.; F. J. Haywood,

(Continued at end of this section)



New Mills of the Naumkeag Steam Cotton Co., Salem, Mass.

Superiority of Westinghouse Type CS Motors Again Demonstrated

4000 Horsepower

of Westinghouse Type CS Steel Frame Motors with Control has just been installed in the new mill of the Naumkeag Steam Cotton Company.

Write today for Textile Quarterly No. 9, telling all about the Type CS Motors.

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Charlotte, N. C.

BIRD'S-EYE VIEW OF NAUMKEAG STEAM COTTON CO.'S MILLS BEFORE THE SALEM FIRE

The Story of the New Naumkeag

THE reconstruction and equipment of the large plant of the Naumkeag Steam Cotton Co., manufacturers of the famous Pequot and Naumkeag sheets and pillow cases, Salem, Mass., would have been an important feature of textile history in a year of active mill expansion, and it stands pre-eminent among the comparatively small mill development of 1915. It replaces the various mills, weave sheds and storehouses that made up the old plant which, with the exception of a small reinforced concrete warehouse, was completely destroyed in the holocaust suffered by Salem in June, 1914.

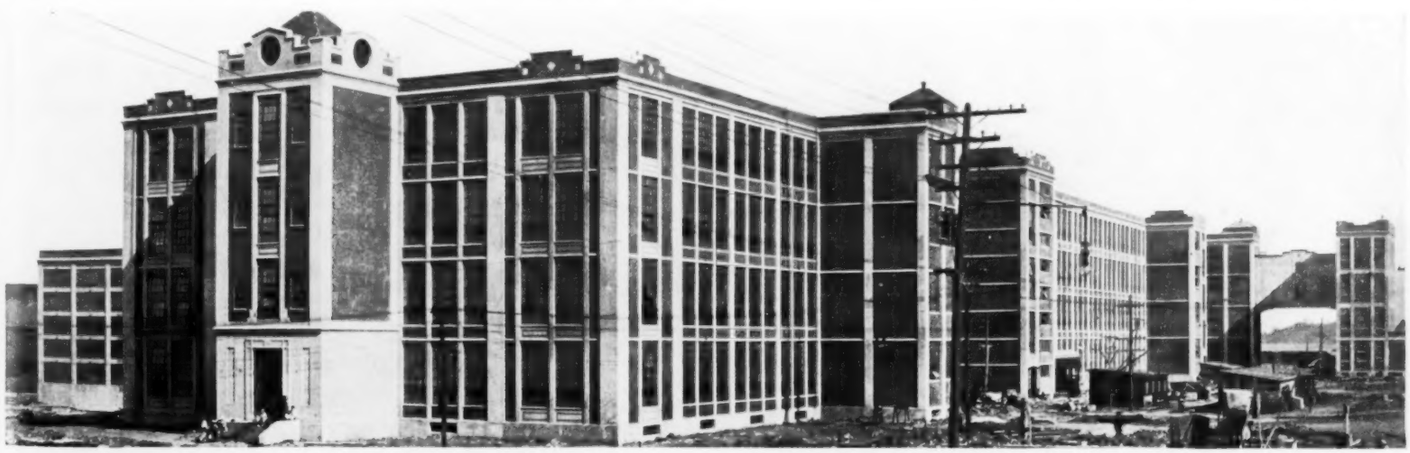
With the experience of this fire fresh in their minds, and strengthened by the advice of able engineers and by the desire to erect mill buildings representing the most advanced, but practical, standards compatible with reasonable first cost, it is not strange that reinforced concrete construction should have been decided upon by the Naumkeag management. Even if the company had not had the benefit of a visual demonstration of the fire resistant quality of such construction, given by the storehouse that came through the heart of the fire unscathed, it is hardly likely that their decision would have been different. The result is a group of three principal structures, a storehouse, spinning mill and weave shed, all of which are admirably designed for their particular uses. Each is of the so-called mushroom type of construction with brick curtain walls. This use of brick gives a pleasing architectural finish, particularly in the big spinning mill, whose walls are largely glass and whose long reaches are broken by numerous towers. Each structure is the largest ever built in reinforced concrete for textile uses, and the weave shed is also the largest saw-tooth shed in the world, so far as known, having 308,000 square feet of floor space.

Fire-resistant quality of construction was the prime consideration in the designing of the big cotton storehouse, but in the case of the spinning mill and weave shed the question of fire resistance and rigidity received no more consideration than those factors involving the safety and comfort of operatives. The rooms are all unusually high studded and well ventilated; except for a curtain wall about three feet high the spinning mill walls are glazed and plain glass is used, instead of wire glass, in one row of every sash to allow the operatives to see outdoors; toilet rooms have numerous porcelain wash bowls and high grade plumbing; individual lockers are being installed for all the help; wood flooring has been laid in all rooms excepting under pickers, cards and drawing largely for the operative's benefit; the wainscoting and the posts to the same height are painted a deep and cheerful shade of blue; the side and cross aisles are unusually wide and the machinery is all spaced wider than usual. Having given so much consideration to its operatives, and, in addition, provided a large number of handsome cottages and apartment houses for family help, it is not strange that the management has found no difficulty in obtaining an ample supply of high-grade help. It has not forgotten its personal comfort, however, and is now completing a handsome brick office building of two stories and basement, 105 by 37 feet, at the Harbor Street entrance to the mill yard.

VIEW OF NAUMKEAG WEAVE SHED TAKEN FROM TOP OF SPINNING MILL. IN FRONT CENTER OF PICTURE IS THE REINFORCED CONCRETE STOREHOUSE THAT IS THE SOLE SURVIVOR OF THE FIRE THAT DESTROYED THE OLD PLANT

PRINCIPAL FEATURES OF OLD PLANT

Before considering the details of construction and equipment of the new plant it may prove interesting to recall the salient features of the old Naumkeag. A good general idea of the layout of the old plant is obtained from the bird's-eye view taken before the fire, and published in this connection. The old weave shed, which is shown at the right of the picture, stands on the site of the center section of the present weave shed; in fact, the foundations of the old structure were not injured by the fire and were used for this part of the new shed. Between the weave shed and the cloth hall, shown in the right foreground of the bird's-eye view of the old plant, appears the reinforced concrete storehouse that came through the fire unscathed. This building is also shown in the picture of the new weave shed, and by referring to the latter a good general idea of the layout of the new plant, as compared with the old, will be obtained. The present weave shed is enormously larger than the old one and not only provides space for the



NAUMKEAG SPINNING MILL (SOUTH SIDE) SHOWING WEAVE SHED TOWER AND CONNECTING BRIDGE

THE ELABORATE CLOCK REGISTRY SYSTEM

which you have installed for your night watchman, inside your factory, is good—as far as it goes. Every morning it shows you that the watchman was, or, for some reason, WAS NOT, at certain places at certain times.

The assurance of protection which this system affords the inside of your factory cannot compare with the protection given to your factory against outside intrusion by

CYCLONE PROPERTY PROTECTION FENCE

This is not a "come-and-go," "hit-or-miss" protection, but ever-present, everywhere around the grounds, day and night—always dependable.

Cyclone Chain Link Woven-Steel Fabric is made of heavily galvanized wire, specially drawn for this purpose. The method of weaving forms a double brace in every link, combining the highest degree of strength with shock-resisting flexibility.

Barb wire top, on one side or on both sides, prevents trespassers from climbing fence.

Cyclone Posts are specially strong—built of heavy tubular steel, which insures equal resisting power from all sides against rust, or strain, or shock.

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because it is always dependable—no rust, no decay, no annual repair expense, and no pulling down, breaking through or climbing over.

We have made the subject of protecting factory property a study for years; we are the largest manufacturers and the recognized leaders in fence construction work in this country. We build fences to suit your special needs, of various styles and heights, with gates to fit any openings for alleys, driveways, or switch tracks.

Let our engineers help you solve your fence problems without charge. We furnish services of construction superintendent at nominal cost.

Illustrated Catalog giving full description and prices sent on request.

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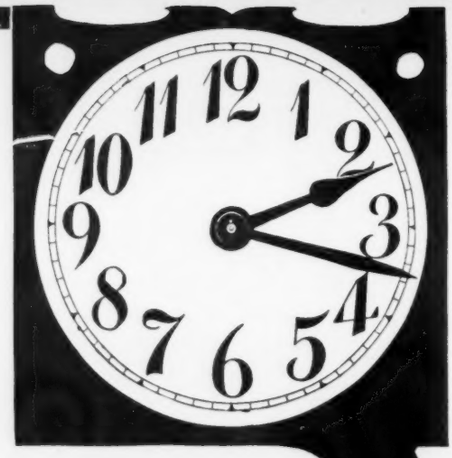

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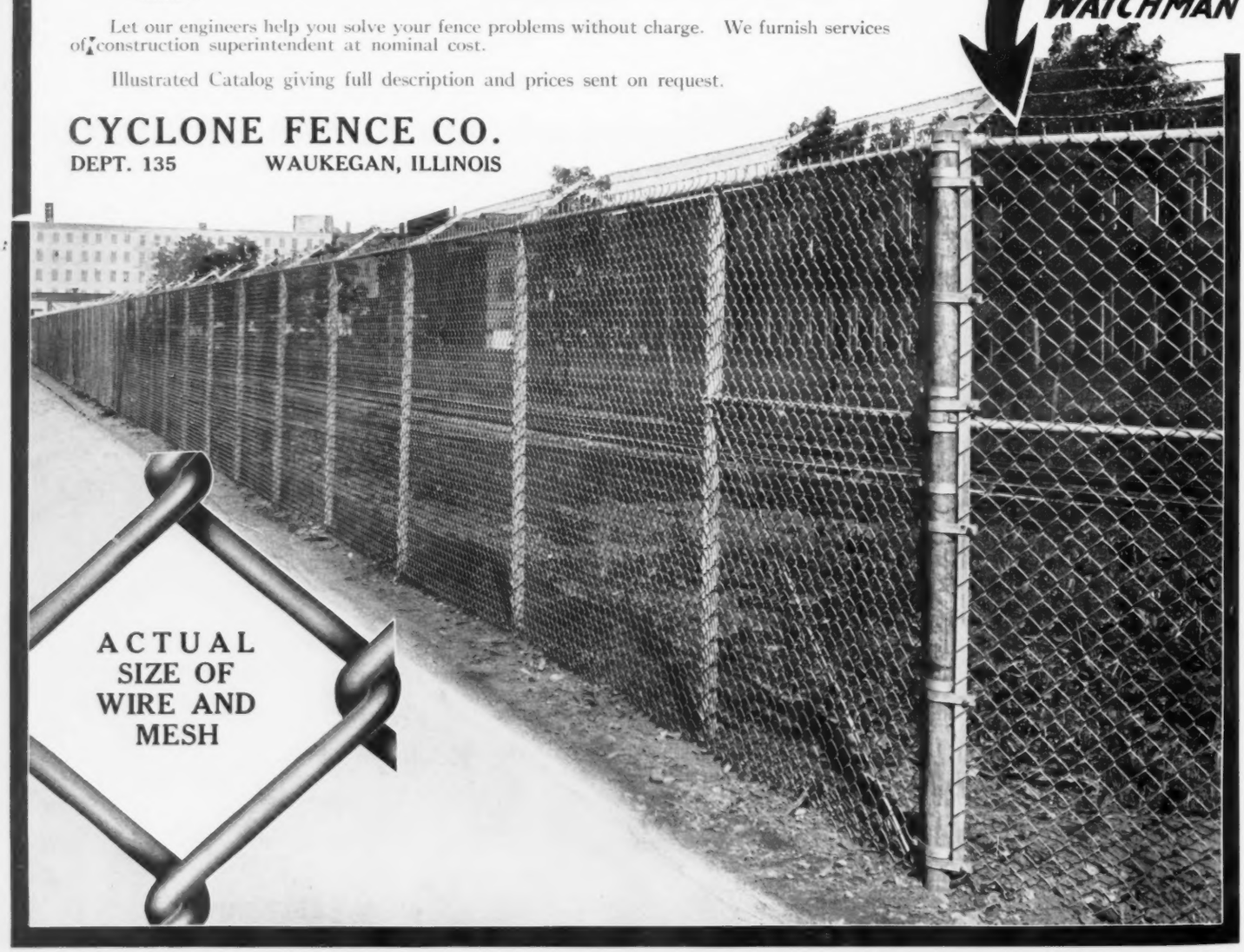
is Fire-proof, Weather-proof, Thief-proof.

Promotes Safe and Sanitary Conditions because it permits easy inspection at all times.

NO CLOCK NEEDED WITH THIS WATCHMAN



ACTUAL SIZE OF WIRE AND MESH

looms that are at present operated by the company, but leaves considerable room for future expansion. In the old plant looms were operated not only in the weave shed, but in the five-story building shown in the center of the old plant, and in the two-story building in the foreground. It will also be noted by reference to the view of the old plant that carding and spinning machinery was scattered through four buildings, whereas in the new plant it is all concentrated in one large mill. In the old plant, too, cotton and cloth were stored in various small buildings scattered throughout the yard, whereas now the cotton is concentrated in the large storehouse running parallel with the spinning mill, the smaller concrete storehouse that came through the fire being used for such gray goods storage as is found necessary at this plant. It may be well at this point to draw attention to the fact that all of the bleaching and finishing for the Naumkeag is done at their works in Danvers, a few miles from Salem. This separate location of the plant proved a fortunate matter for the Naumkeag after the fire, for they had a considerable stock of goods at the bleaching plant and this, with about $100,000 worth of gray goods stored in the concrete storehouse, allowed them to fill most of their orders until looms could be started in the storehouse and later in the first section of the new weave shed.

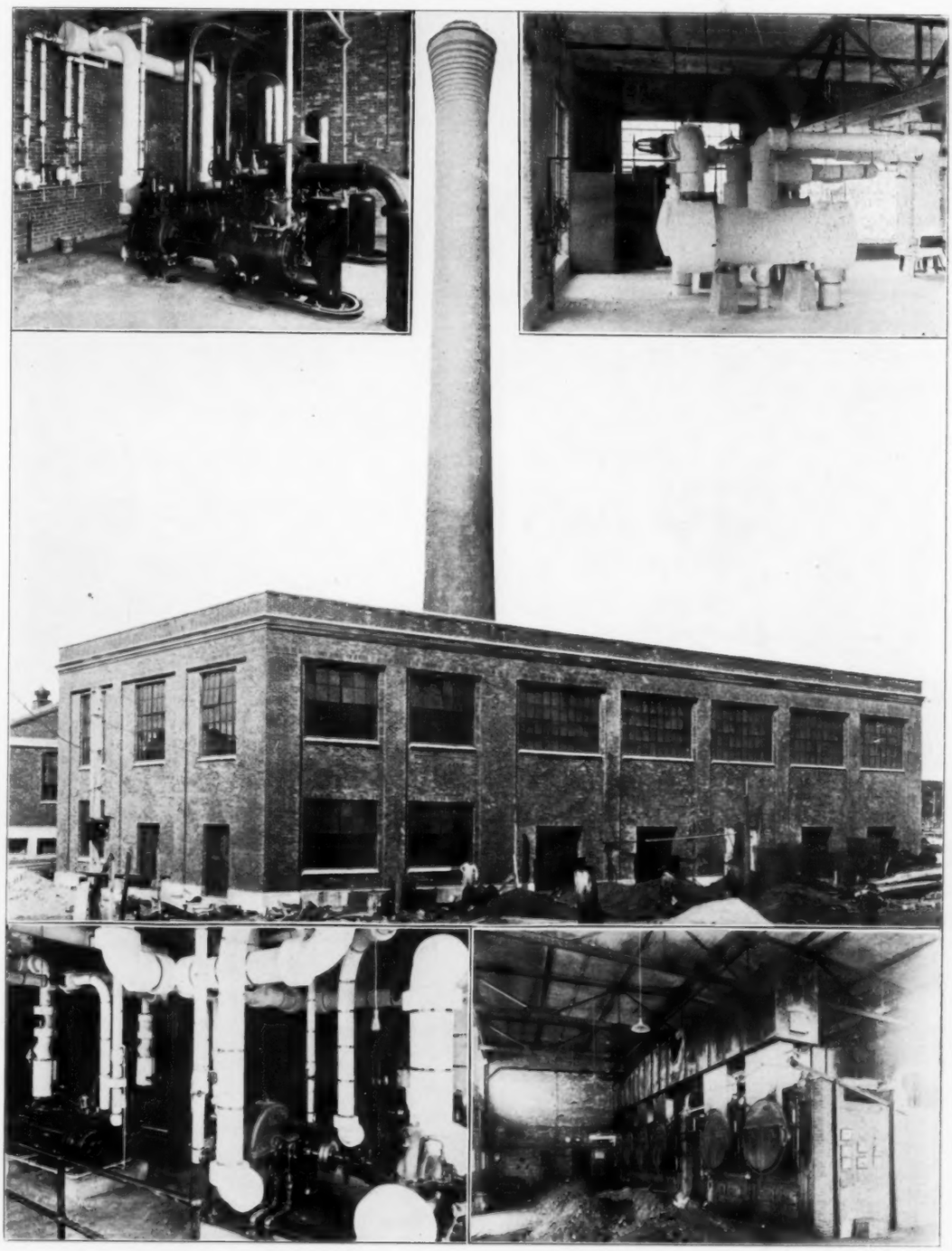
DETAILS OF OLD PLANT

The old weave shed had been built in two sections, one 215 feet by 244 feet, and a later addition 120 by 421 feet. It was a saw-tooth roofed building, one story in height, of standard mill construction with concrete foundations on concrete piles. About 1,500 looms were operated in this weave shed, and about 1,000 more were operated in other buildings of the plant. In the spinning mills there was a total of about 120,000 spindles and complementary machinery. The latter buildings had been constructed at various periods since the organization of the Naumkeag and had been modernized to a large extent. All of them qualified under the term "slow burning mill construction" and were insured at a low rate by the Factory Mutuals. Of course, there was no comparison between their structural features and the present plant, the old structures being narrow, low-studded and poorly lighted; in addition there was necessarily a large amount of time and labor lost in transporting materials in process from one building and department to others.

NEW CONSTRUCTION CONSIDERATIONS

In planning the character of the new construction there is little question that the loss of the Naumkeag plant by fire played a considerable part in influencing the management to give prime consideration to the fire-resisting qualities of the new structures. And this, despite the fact that the new buildings are so located and so completely protected that the danger of a conflagration is reduced to a minimum. Without the power of such an example as was accorded by the reinforced concrete storehouse, that came through the fire unscathed, it is a question whether this class of construction would have been so generally used; that is, it might have been used in a more modified form than is the case in the new structures. Quite as important as the materials of construction used is the concentration of the various departments. Each of the new Naumkeag units is complete in itself and has ample room for further extension of the plant. Furthermore, the departmentizing of the various units is logical, and so planned as to allow

FRONT VIEW OF NAUMKEAG SPINNING MILL AND STOREHOUSE IN PROCESS OF CONSTRUCTION



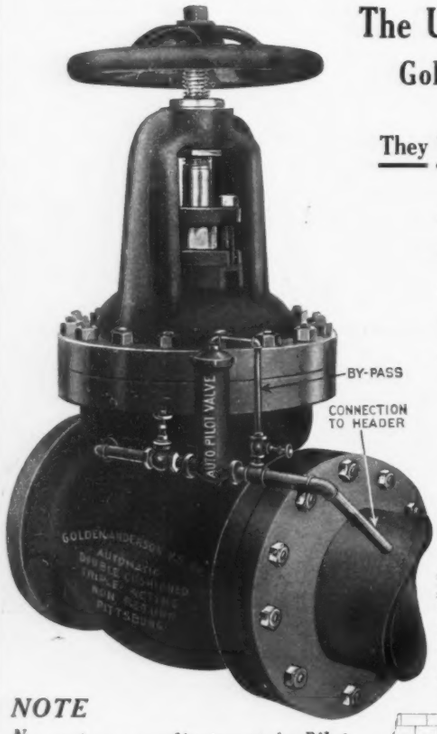
NAUMKEAG BOILER HOUSE, EXTERIOR AND INTERIOR. AT TOP (LEFT)—PUMP ROOM. (RIGHT)—HEATER ROOM. AT BOTTOM (LEFT)—ENGINE ROOM. (RIGHT)— BOILER ROOM.

"Life and Property Insurance Valves"

The U. S. Steel Corporation Has Ordered 1227

Golden-Anderson Automatic Double Cushion Triple Acting and Non-Return Valves

They Work Both Ways Protecting the Boilers and the Steam Lines



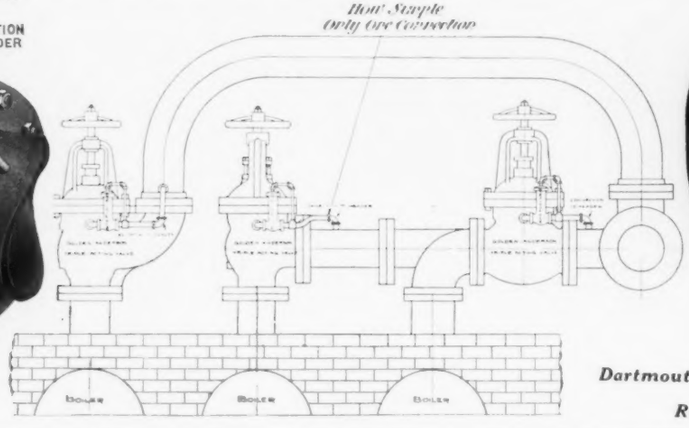
A positive protection against the disastrous effects of accidents to the boilers and steam pipe lines.

They combine the functions of an automatic non-return, safety, emergency and hand stop valve—all in one.

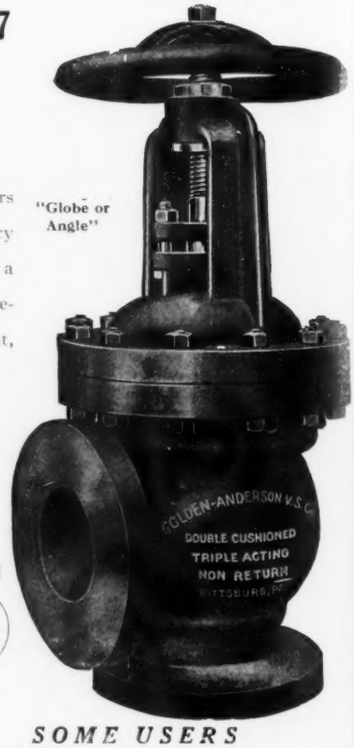
Automatically shut off the steam flow from every boiler the instant that a pipe ruptures, and immediately cut out a boiler when a tube bursts.

Fitted with double "Corliss Dash Pot" type cushion which absolutely prevents chattering and maintains exact alignment.

The valves can be closed by steam or electricity from any part of the plant, or they may be closed by hand like an ordinary valve.



"Globe or Angle"



NOTE

No springs or adjustment in Pilot valve or Triple-Acting valve. Valves positively "Fool Proof"

SOME USERS

Dartmouth Mfg. Corporation
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Golden-Anderson Patent Automatic Cushioned Water-Regulating Valves

Sizes to 24"

Automatic Water-Pressure Regulating Valve

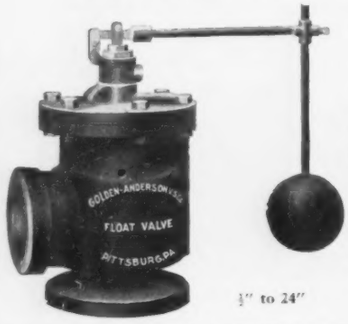
These valves are for automatically maintaining a reduced water pressure in mains or wherever it is desired to reduce a high-pressure to low-pressure service for domestic distribution.

Can also be fitted with a quick opening electrically operated attachment to use in case of fire or whenever the full pressure is desired.

For High or Low-Pressure Service

Always Cushioned in Opening and Closing

The Golden-Anderson Automatic Cushioned Float Valves

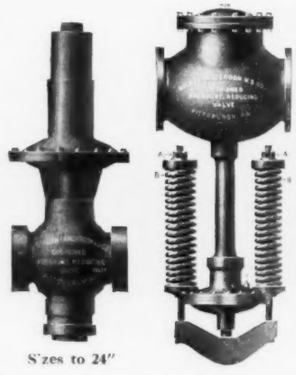


½" to 24"

"Angle or Globe"

Positively maintain water-level in tanks or standpipes. Float swivels to any angle desired. Perfectly cushioned by water and air in opening and closing. No metal to metal seats in any of our water service valves.

G-A Pat. Cushioned Pressure Reducing Valves



Sizes to 24"

Embody the elements of simplicity, strength and reliability. Positive in action and always ready for service. Set valve to deliver high steam or other pressure at any reduced pressure, and its action thereafter is entirely automatic.

Nothing to break, stick or require attention.

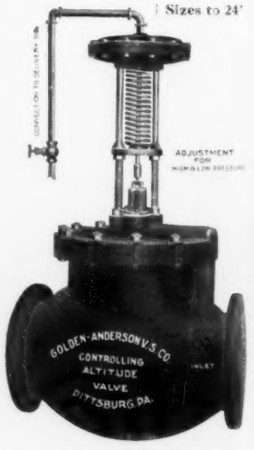
Perfectly cushioned in opening and closing and operates without noise.

Will stand the wear and tear of years without repairs.

No wire drawing can occur, as small auxiliary valves, by-passes, etc., are eliminated

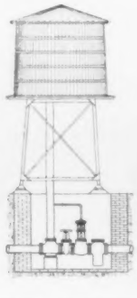
Golden-Anderson Patent Automatic Cushioned Controlling Altitude Valves

Sizes to 24"



For Automatically Maintaining Uniform Stage of Water in Tank, Reservoir or Standpipes. Doing Away with the Annoyance and Freezing of Floats or Fixtures Inside the Tanks. Especially Adapted for Water Works and Railroads, or where a constant water used is desired maintained.

"ATTENTION"



The upper part of the body is lined with **bronze**, also the **piston or valve is all bronze**, fitted with rubber or leather cups and disc, preventing any metal parts coming in contact. The piston operating in a vertical position, and being **cushioned at all times in opening and closing by water and air, absolutely insures positive operation on the varying pressures,**

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"Works Both Ways"

"Most Satisfactory Valves Known"

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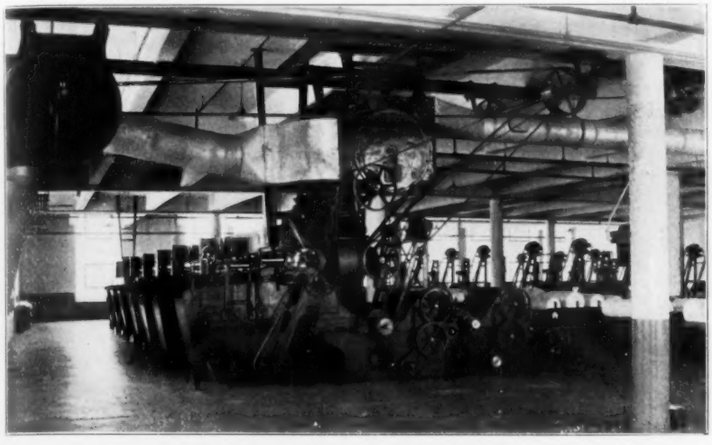
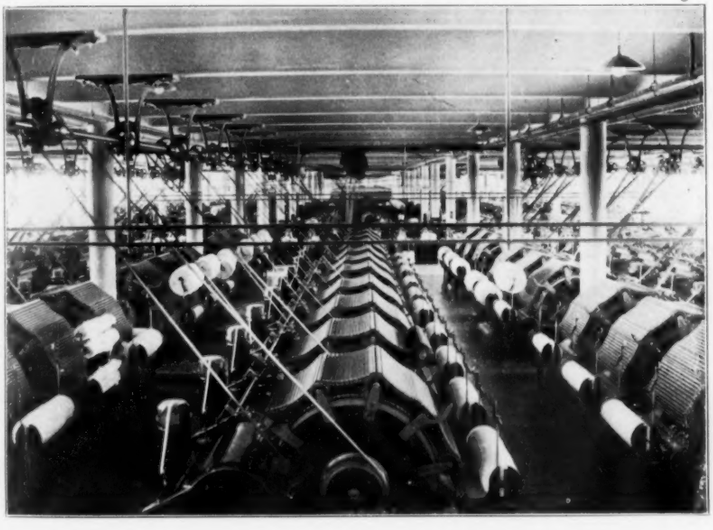
a steady and continuous flow of materials from one process to another. With the exception of the opener rooms, which are located in fireproof sections on the first two floors of the East end of the cotton storehouse, the spinning mill is a complete unit, and its operation will not be checked for a moment if the opener rooms should be rendered inoperative temporarily; in fact, when the plant was first started the feeders in the picker room were fed by hand for some weeks. The weave shed is also complete in itself, the slashers and warp-tying machines being located at one end and the cloth room at the other end. It would thus be possible for the weaving to continue through the purchase of yarns in the open market, even if the spinning mill was destroyed; in fact, a large proportion of the looms were in operation before the new spinning mill was completed and were supplied by yarns bought from other mills.



ONE OF THE TWO NAUMKEAG PICKER ROOMS



A NAUMKEAG CARD ROOM

The efficient and modern character of the construction and departmentization of the plant is best disclosed by the description of construction and equipment.

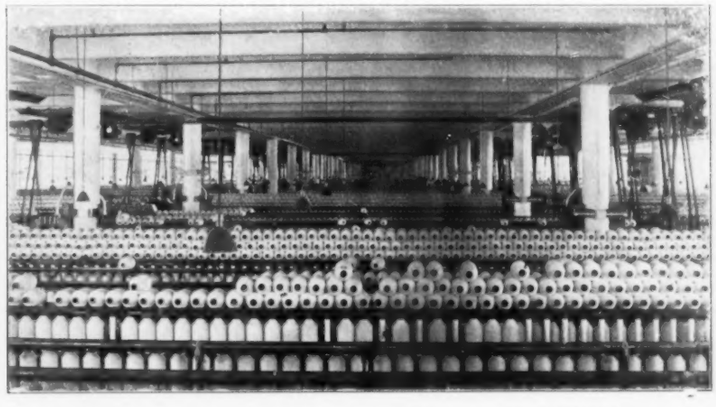
CHRONOLOGY OF NAUMKEAG CONSTRUCTION

The rapidity with which the Naumkeag has recovered from the conflagration of 1914 is one of the most interesting features of the reconstruction of the plant. The fire occurred June 25, 1914, and on Aug. 13 weaving had been started in the reinforced concrete storehouse that survived the flames. About the same time plans were completed and work commenced upon the central section of the new saw-tooth weave shed of reinforced concrete construction, and also upon the boiler house to be used for operating the heating plant and fire pumps. The central section had an area of about 100,000 square feet and it, together with the heating and pumping plant, was built by the New England Concrete Construction Co., Boston, looms being in operation in this part of the weave shed Dec. 23. Early in November plans had been completed by Lockwood, Greene & Co., the engineers and architects for the whole plant, for the balance of the weave shed and for the spinning mill and storehouse. The contract for the spinning mill and storehouse was let to the Turner Construction Co., New York, and work on the foundation was started Nov. 3 and the foundations were finished early in April. The roof of the storehouse was finished June 4, but adverse conditions hindered the construction work on the spinning mill and the latter was not roofed in until July 12. Work on the north and south ends of the weave shed was not started until the spring of 1915, the contracts for both of these structures having been let to Fred T. Ley & Co., Springfield, Mass., these portions of the structure being roofed in late in the summer. On Dec. 1, 2,000 looms were running in the completed weave shed and it is expected that the complete complement of 2,600 looms will be in operation on Feb. 1, at which time it is anticipated that all of the spinning machinery will be running.

Naumkeag Spinning Mill and Storehouse

By W. R. Sides

ON June 25, 1914, practically the entire plant of the Naumkeag Steam Cotton Co. was destroyed by fire and on Sept. 30, 1915, this concern was occupying an entirely new fireproof plant constructed of reinforced concrete. The decision to build of this material was reached after a rigid investigation by the owners and engineers of the relative merits of "brick and mill construction sprinkled" and reinforced concrete. One fact greatly influenced their decision: The only structure of their former plant, which consisted mostly of mill constructed buildings, to come through this great conflagration was a reinforced concrete storehouse situated in the direct path of the flames, subjected on all sides to the intense heat and in which not a



VIEW ACROSS ROVING AND SLUBBING FRAMES IN THE NAUMKEAG

FRONT VIEW OF NAUMKEAG SPINNING MILL AND STOREHOUSE (CHIMNEY OF SALEM ELECTRIC CO., WHICH FURNISHES POWER TO THE NAUMKEAG, IS SEEN ABOVE END OF STOREHOUSE)

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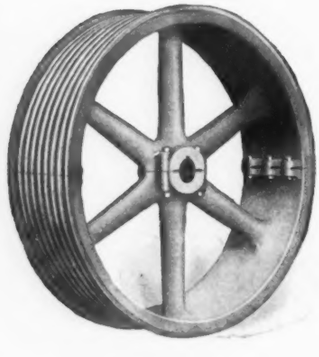

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New England Office
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Boston :: Mass.

dollar's worth of goods was destroyed. This lesson could not be denied.

In order to make possible this remarkable rebuilding record, it was necessary that the plans be prepared promptly, the contracts let without delay and that work be undertaken at once.

On Nov. 3, 1914, the foundations, which were of an exceedingly difficult nature, were started. Concrete piles, spread footings on soil and pedestal footings to rock were the three types used. All were necessary owing to the variable character of the sub-surface. A large number of the pedestal footings were carried to rock found at 24 feet below high water. In spite of their great difficulty, and by working at all hours chiefly between tides, these foundations were completed about April 7, 1915.

RAPID CONCRETE WORK

On the mill, which was built in two sections in order to obtain a maximum use of forms, the first self-supporting floor of the first section was finished on April 17, 1915, and on July 12 the roof of the second section was poured, eight moves in 12 calendar weeks, besides the removal of forms from the roof of the first section and their erection for the first self-supporting floor of the second section. This is at the rate of about 37,000 square feet of floor space concreted per calendar week. On the storehouse the first self-supporting floor was finished on May 4 and on June 4 the roof was finished, 8½ weeks to place 207,500 square feet of floor space. This is an average of 24,300 square feet of floor space per week. Therefore, combining the two buildings, over 60,000 square feet of floor, including columns, beams, girders and floor slab was concreted per week, every week for eight weeks. In order to maintain this average it was necessary on several occasions to concrete 22,000 square feet in one working day. The foregoing records were made possible by efficient plant layout, experience and thorough organization of the field forces and by establishing and maintaining (almost daily) constant co-operation between the field forces and the purchasing, engineering and construction departments at the head office of the contractor.

DESCRIPTION OF THE SPINNING MILL

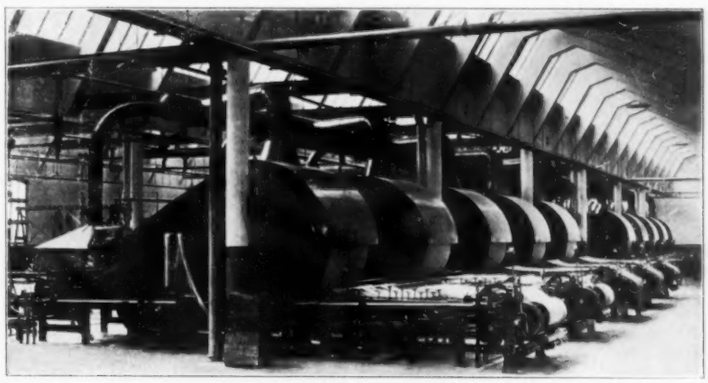
The spinning mill is four stories and basement, 722 x 135 feet of reinforced concrete construction with brick panel walls, and with small structural steel shapes in the columns to reduce their size to a minimum. The stories were made of exceptional height, 16 feet floor to floor, in order to insure maximum light in the interior bays of the building. One-half of this building has granolithic floor finish placed monolithic with the slab, and figured as a part of it, while the other half has a top flooring of maple placed on creosoted under flooring which rests on sleepers placed in cinder concrete. The beam and girder type of construction was adopted for the mill and the bays made 26 x 24 feet center to center of columns, these dimensions being determined by the size and the economical placing of the machines. All sash is solid steel glazed with wired glass and fitted with a fusible link for the ventilated sections. From the illustrations it will be seen what a large percentage of the wall area is glass. The building was designed for 100 pounds live load, which modern practice has found to be ample for mills of this description. One feature which will appeal to the manufacturer is the fact that there is not a single unnecessary obstruction throughout this building for its entire length and breadth. All toilet rooms, stairs, elevators and pipe shafts are placed in the seven outside towers, thus making it possible for the entire floor space to be utilized in manufacturing.

THE STOREHOUSE CONSTRUCTION

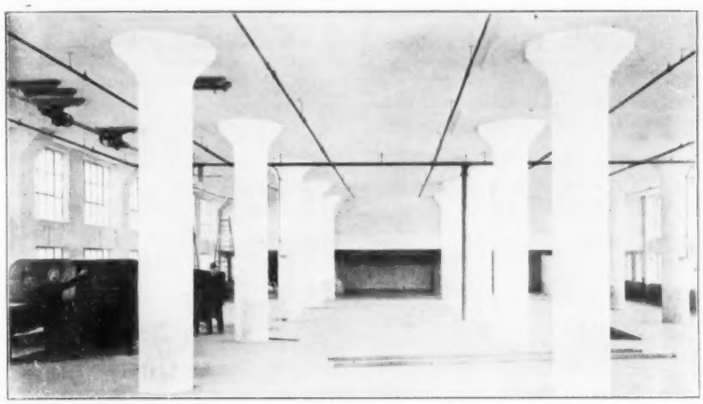
The storehouse is five stories and basement, 500 x 110 x 55 feet, of reinforced concrete construction of flat slab type. The curtain and panel walls are brick and there are no structural steel shapes in the columns. The story heights are uniform, 8 feet floor to floor, a height which permits the piling of bales of cotton on end, with just the necessary distance between the top of the bale and the sprinkler heads. The floor finish is granolithic, placed monolithic with the slab, and figured as a part of it. The flat slab system of reinforced concrete construction was adopted for this storehouse with typical bay 18 feet 4 inches by 16 feet 8 inches and a 6-inch floor slab, carrying a four-way system of reinforcement, and designed to withstand 150-pound live load. All sash is solid steel, glazed with wire glass.

These two buildings were built for the Naumkeag Steam Cotton Co., Salem, Mass., under the direction of Lockwood, Greene & Co., engineers and architects, Boston, Mass., by the Turner Construction Co., of New York and Buffalo.

ONE OF THE NAUMKEAG SPINNING ROOMS



FRONT VIEW OF SLAS HERS AT NAUMKEAG



ONE OF THE OPENER ROOMS IN NAUMKEAG STOREHOUSE

Organization of the Naumkeag Plant

THE efficient manner in which the various departments and machinery of the Naumkeag are organized is even more important than the construction features of the new plant. Starting with the cotton storehouse, there is a steady and uninterrupted flow of materials through the plant, with a minimum of waste motion and effort, until the grey goods leave the cloth inspecting room. It is possible that with considerable additional expenditure some trucking might have been saved in getting slasher beams and filling to the weave room floor, but the resultant saving in labor would have been small. Hardly less important than the systematized lay-out of the departments and machinery are the many features designed for the improvement of working conditions and the comfort of operatives, all of which tend to make the help more contented, and make a job in the Naumkeag worth striving for.

Cotton is received in the storehouse through two entrances, located at either end of the long gallery that extends across the front of the two center sections, each of which is 116 feet long. Galleries are similarly located on the other floors and elevators are located at each end of the galleries. The sections at each end of the building are 133 feet long. At the West end of the first floor is the receiving and sampling room, extending the length of that section and about 35 feet wide. At the other end of this and the second floor are the cotton opening rooms, from each of which the cotton is sucked through an exhaust pipe to their respective picker rooms, being delivered through condensors upon a Morton distributing conveyor which in turn delivers the cotton to the feeders. All of the preparatory, carding, roving, spinning and spooling machinery was furnished by the Saco-Lowell Shops, together with the slashers. The warpers and the looms were furnished by the Draper Co.

In each of the picker rooms, which are separated from the card room by a fire wall, are seven sets of three-system picking, each of the machines being belt-driven by an individual motor. The picking equipment also includes a five-section waste machine and a soft waste cleaner. The picking machinery, cards and drawing frames are set directly upon the concrete floor, but all of the other machinery is set on wood flooring. The latter is constructed with 2 by 4 inch screeds set in cinder concrete on a 4-inch concrete slab; seven-eighths-inch North Carolina pine is nailed to the screeds and above this is seven-eighths-inch maple flooring. Upon entering the card room attention is attracted by the finishing of the rooms that is used throughout the mill. Excepting for a wainscotting that is painted a deep blue, all of the walls, ceilings and posts are painted white, and all of the posts to a height of four feet are covered with sheet steel. It is also noticeable that all aisles are unusually wide and the ceilings exceptionally high, the average height in the spinning mill being 16 feet from floor to ceiling. The walls above the wainscotting are practically solid glass set in United steel sash furnished by the Trussed Concrete Steel Co. All of the incandescent lamps have reflectors, and the placing of the lamps, as well as their size and the shape of the reflectors, are adapted to the varying character of artificial lighting required, a maximum of light being thrown just where it is needed. The spinning mill is humidified by the "Turbo system" furnished by the G. M. Parks Co., the shafting by the William Sellers Co., and the motors by the Westinghouse Electric & Manufacturing Co.; the four-frame drive is used for spinning and the group system is used for the balance of the driving in this mill.

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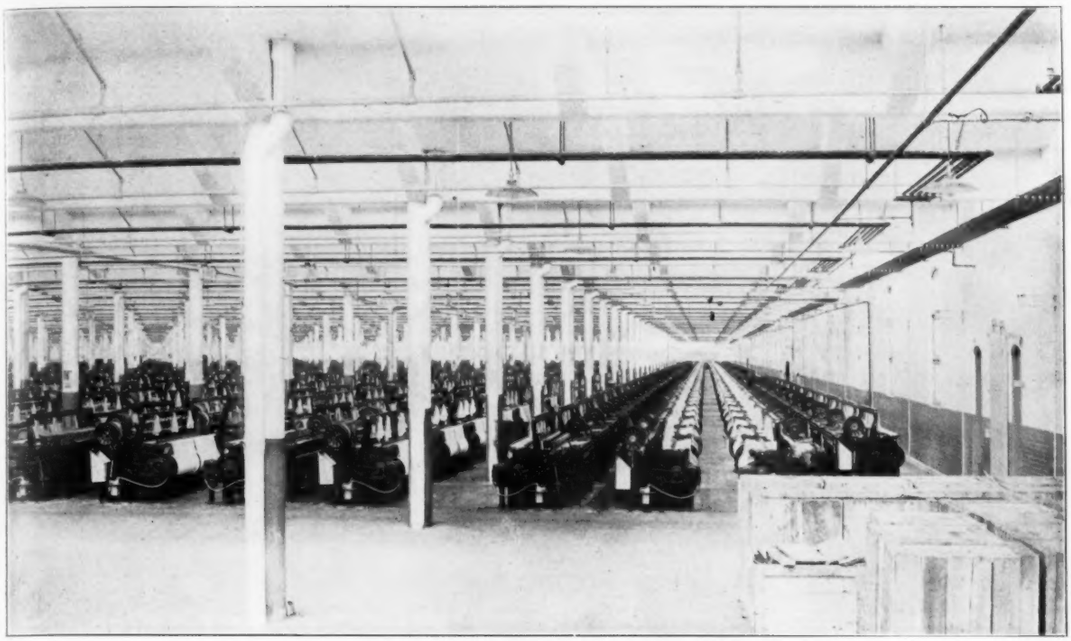

INTERIOR VIEW OF NAUMKEAG WEAVE SHED

The 40-inch cards are set parallel to the sides of the mill and the sliver goes from them to the evener drawing and thence to the regular drawing. The drawing, roving, spinning and spooling frames have aisles running across the mill, and the warpers are set parallel to the sides. The carding and roving rooms have equipment practically duplicated on the first and second floors. The third floor is devoted to ring filling and is equipped with 216 frames of 264 spindles each, all of the spinning being tape-driven with seven inch traverse, the filling having 1¾-inch rings, and the warp 1⅞-inch rings. The fourth floor is equipped with 248 warp frames of 216 spindles each, the balance of the room being devoted to spooling and warping, the spooling being the latest pattern tap-driven, metal-construction machines built by the Saco-Lowell Shops and the warpers being the Draper Co.'s latest type. From thence the warp and filling go to the weave room which is described in detail in another column.

THE MAMMOTH WEAVE SHED

Some idea of the vast dimensions of the mammoth weave shed may be gained from the picture looking across it from the spinning mill. It is a one-story and basement structure with sawtooth roof, built entirely of reinforced concrete, with brick curtain walls, and having galvanized steel sashes and wire glass glazing. It is necessary to qualify the latter statement because of an unusual arrangement that has been made for the satisfaction of the operatives, the bottom lights of all the side windows being glazed with clear glass and only the upper sashes being of wire glass. In the spinning mill it is the row of lights next to the bottom that is plain glazed.

The weave shed is of irregular ground dimensions, being 988 feet long, with one-half of the length 420 feet wide and the remainder 212 feet wide. It contains 308,000 square feet of floor space, or about seven acres, and it is believed that this is the largest weave shed in the world on one floor. At the northwest corner of the shed is located the elevator tower, 25 by 55 feet and four stories high, connecting with the third and fourth floors of the spinning mill by a 70-foot covered bridge.

Filling is trucked across the bridge from the filling spinning room on the third floor and is stored and conditioned in a room provided in the elevator tower until needed. The slasher beams are trucked across the top story of the bridge and go down the 8 by 12-foot elevator direct to the slashers at the end of the weave shed adjacent to the tower. There is ample storage room back of the slashers for beams, and in front of the slashers and the parallel Barber-Colman warp-tying machines, for loom beams.

The slashing equipment installed here is one of the finest in the country. It consists of two batteries of five Saco-Lowell machines: One 68-inch, one 56-inch and three 48-inch in each battery. The machines extend in a row across this end of the weave shed, a raised platform between the two batteries carrying the size-mixing apparatus. The cylinders of each machine are insulated, and copper hoods and exhaust pipes connect with Sturtevant fans that deliver excess heat and steam through vent pipes in the roof. All the size boxes are fed by the Nivling system, which not only maintains any desired level, but simplifies the cleaning of the boxes and economizes the amount of sizing used. The warper-beams are handled by overhead trolley tracks and hoists.

The shed will house 3,000 looms, but only 2,600 are to be installed at present, a large proportion of which will be 110 inches wide, and varying from this down to 32 inches. The looms are all Northrop automatics made by the Draper Company. All are direct-driven with individual motors of three-quarter horsepower and one-half horsepower, furnished by the General Electric Co.

At the South end of the weave shed is located the cloth-inspecting and storage rooms, but there is no provision for a large amount of cloth storage at this plant, and all but the goods sold in the grey are taken to the bleachery at Danvers as fast as woven. Five ells are located around the sides of the weave shed, in which are locker rooms and lavatories. Steel lockers are provided in all rooms for the help, together with drinking fountains and other up-to-date conveniences. Humidifiers of the Garland type are used in the weave shed and were furnished by the American Moistening Co.

HEATING AND PUMPING BUILDING

At the east end of the weave shed is located the central heating and pumping station for the plant, in a one-story building, 122 by 56 feet. It should be stated in this connection that, for the present at least, the Naumkeag will have no power plant to furnish the 5,000 horsepower needed to operate its machinery. Power for motors and lighting is furnished by the Salem Electric Lighting Co., whose plant is only a few hundred yards from the Naumkeag buildings. The hot-water system of heating is used, and the boiler plant contains six H. R. T. boilers, for which a 150-foot chimney furnishes the draft. The heaters and pumps for the hot-water heating system are in duplicate, the combined heating and automatic sprinkler system being furnished by the General Fire Extinguisher Co. In a separate room of the boiler house are located three Underwriters fire pumps, the water supply for which is obtained from the adjacent bay through a conduit at low-water level that ends in an intake well directly below the pumps.

New Naumkeag Office Building

AN office building has been erected in connection with the new mill building of the Naumkeag Steam Cotton Co., that is architecturally in keeping with the remainder of the layout, and has been particularly planned for the purposes for which it is intended. The building, according to working drawings laid out by the architects, Kilham, Hopkins & Smith, is a two-story structure with basement.

The first and principal floor is very compact and complete in its arrangement. Entering the vestibule, raised a few steps above the street on which the building is located, the visitor finds himself in a corridor separated from the general office by an oak counter. To the left is a private corridor giving access to the agent's and treasurer's office, which is 20 x 34 feet in size. In connection with this room, which is equipped with a fireplace, is a private consultation room and a toilet.

The general office is 24 x 40 feet, exclusive of the width of the corridor, and will be arranged for ten or twelve desks. It is connected with the agent's and treasurer's office by a second corridor by which it is possible for the agent to be perfectly in touch at all times with every detail of the work he is directing. Opening from the second corridor is the counting-out room for the paymaster and his assistant, a room which will be devoted to the stenographers, the telephone switchboard, and the private telephone booth, and adjoining this is a toilet in connection with the stenographers' office.

Passing to the right in the main corridor, a hall is entered from which stairs lead to the basement, from which access is had directly to the mill yard. The office messenger is located in a convenient part of this hall, and from it the locker room and offices for the use of the superintendents open out. There is also an entrance for the stairs which lead to the storage room, the staircase hall, which gives access to a second small office. The locker room is directly entered from the general office also and will contain sufficient lockers for the working force as well as adequate toilet arrangements. There is a private toilet in connection with the superintendents' offices. Facing the general office is the entrance to the vault, a double-walled structure with a four-inch air space between the two walls, supplied with the most up-to-date vault doors conforming in every way to the requirements of the insurance companies.

The arrangements in the basement consist of a vestible with adjoining toilet, from which vestibule the main stairs lead to the first floor. A waiting room is planned in connection with this vestibule and near this is the paymaster's cage. The arrangement is such that operatives may come into the building when they are paid off on special occasions and, after being seated in the waiting room, pass through a corridor in front of the paymaster's cage when their number is called, and, having received their pay, pass through another room and out of the building without retracing their steps. Beyond the waiting room is a storage space and entrance to the first story of the vault. Next to this is the passage to the boiler room and the coal pocket. Beyond this portion of the building is the service room into which space supplies, etc., may be delivered, a granolithic run being provided into it so that teams, etc., may be driven in and unloaded.

The second floor may be reached either from the stairs in the private corridor to the agent's office or from the stair hall in the other end of the building near the superintendents' offices. On the second floor there will be a large stockholders' room reached directly from the stairs from the private corridor, and an anteroom from this, connected with a toilet. On the further side is a storeroom for office supplies, etc. At the other end of the building will be located the draughting room with adequate closets, cases, etc., and in connection with this a blue print room. The third floor of the vault will open directly from the state hall and is designed for the storage of old records, etc.

The building, which is approximately 38 x 115 feet and which faces west, is

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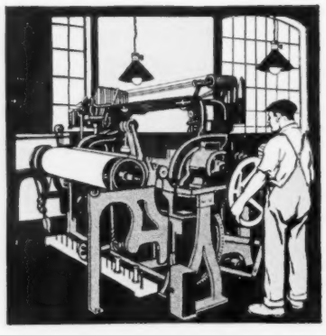


Are you still hauling materials and delivering finished products by teams?

If the answer is "Yes," you are doing something that in its way is as ridiculously inefficient as it would be to equip your mills with hand looms. For where economy, efficiency and speed are concerned, horses and teams are as far behind the Pierce-Arrow Motor Truck as the hand loom is behind the power loom.

The first thing to do is to find out what your present hauling and delivery costs really are. Then ask us to submit definite facts and figures showing just how much Pierce-Arrow Trucks can lower those costs. We shall be glad to do it, and the figures will be conservative and reliable.

THE PIERCE-ARROW MOTOR CAR CO.
BUFFALO, NEW YORK

PIERCE
PIONEER WORM DRIVE

The Worm-Gear

All Pierce-Arrow Trucks are equipped with the worm-gear drive, which is a positive guarantee of effective service under the most difficult conditions.

constructed of brick with granite trim and is of very substantial design, all the framing being of steel with mill-construction floors and roof. Great attention has been given to light and large windows are much in evidence. The finished floors are of oak throughout, except in the basement, where they are of granolithic, and the trim is of oak in all principal rooms and ash in all secondary rooms. The building is lighted by electricity with emergency gas outlets. The heating is by a hot water system and special provision is made for the radiators so that they occur in recesses in front of the windows, and are designed to project as little as possible into the rooms, and to be below the stool caps of the windows.

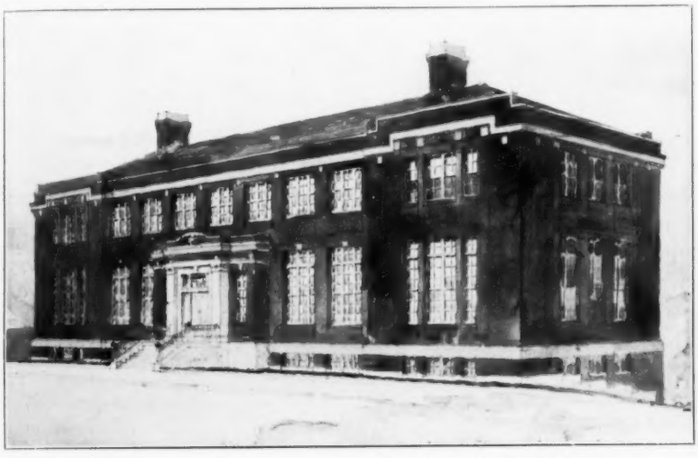
The location of the building is important, it being possible for the agent to command a complete view of the greater portion of the mill buildings and the approaches thereto from the desk location in his office. The front entrance is located directly opposite the main avenue of approach to the plant, and enough space has been provided around the building to enable the owners to plant sufficiently to suggest the charming appearance of the original office destroyed in the fire, with its trees and lawns, as well as to carry out a scheme of planting which will doubtless be carried to completion at a later date.

fire tower stairs on the outside fronts of the building. The main stairs in each case start at the first floor from concrete solid floor, the fire stairs running from cellar to roof.

Each family has its own cellar. Electric light and gas are supplied, with electric meter for each apartment in the basement, and gas meter (which is usually a slot meter) in the apartment itself. From the first floor front hall in each group of buildings there are bells and speaking tubes to the various apartments, so that steps may be saved for those living on the upper floors. The kitchen communicates in each case with the steel frame balcony on the rear, the courts being free from balconies. It is planned in the spring to plant these courts with shrubs and vines, leaving playgrounds in the center.

In constructing these substantial buildings the company has wisely adopted the policy of using the most durable materials, eliminating the necessity of fre-

SIXTEEN-FAMILY APARTMENT HOUSE OF NAUMKEAG STEAM COTTON CO.



VIEW OF NEW OFFICE BUILDING OF NAUMKEAG STEAM COTTON CO.

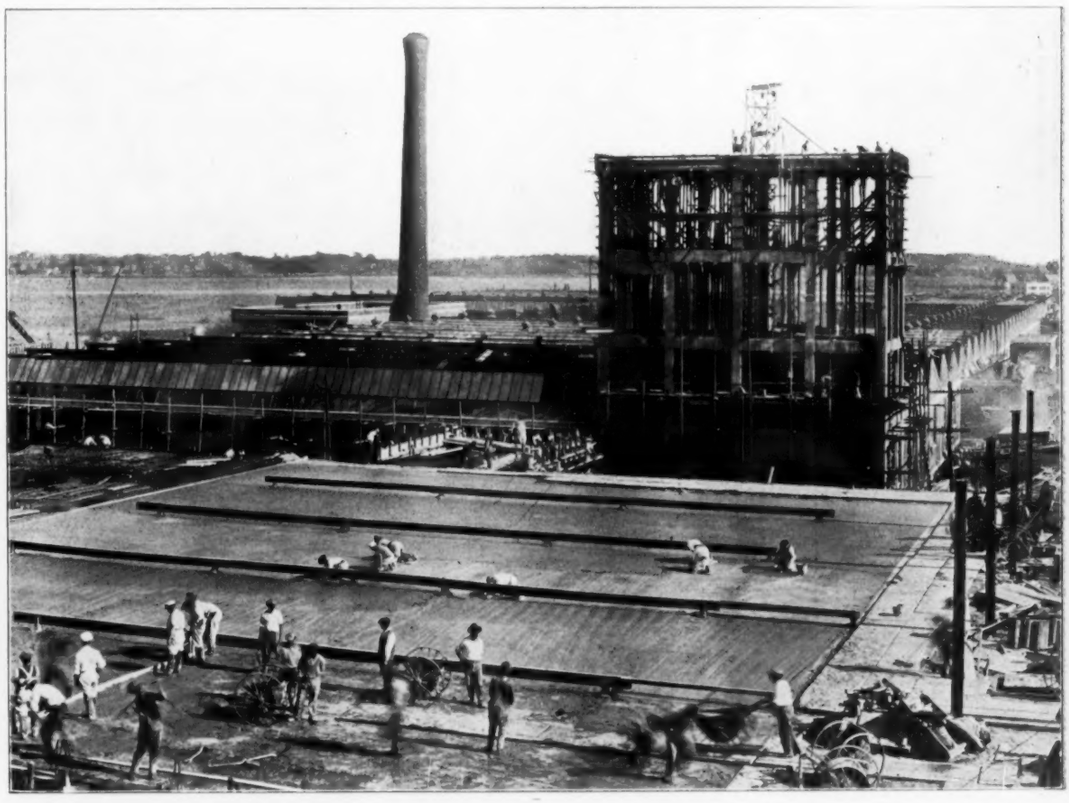
TWO OF A GROUP OF FOUR COTTAGES TO HOUSE FOUR FAMILIES EACH, BUILT FOR NAUMKEAG STEAM COTTON CO.

NOVEL HOUSING AT NAUMKEAG

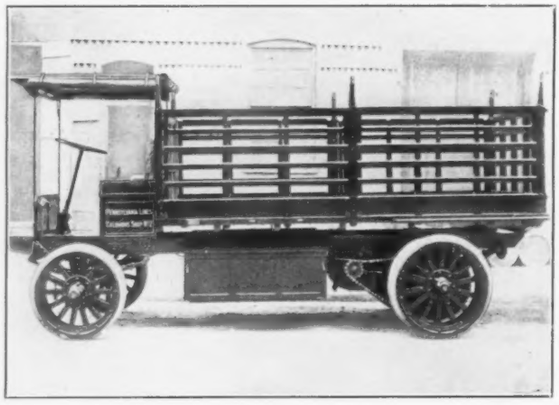
THE Naumkeag Steam Cotton Co. have at present two blocks of tenements, four stories high, one just completed and the other about half finished. The first will house 16 and the latter 20 families. These tenements have no general heating system, though they are completely equipped with plumbing, and an essential problem was to arrange the baths so that there should be no danger from freezing; each apartment, therefore, has its kitchen (which is the living room also) in the center, with bath and bedrooms opening as directly as possible from it. The main room in each case overlooks the courtyard in front where the small children of the families are supposed to play free from the dangers of the street.

The bedrooms are so arranged that there is a space in every room for a double bed and every room has a closet. The living room has a range with boiler, sink and laundry tubs, closet and large dressers for china.

The yard has a high iron fence which is an ornamental as well as a practical feature of the structure. There are two means of exit from each apartment, by the front stairs on the court, or by the



LOOKING ACROSS REAR OF NAUMKEAG SPINNING MILL TOWARD WEAVE SHED. IN FOREGROUND IS SHOWN NEW METHOD OF LEVELING CONCRETE FLOOR WITH STRAIGHT EDGE, FIRST EMPLOYED HERE



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Built in Capacities of 1, 2, 3½ and 5 Tons

Haulage Problems of Textile Manufacturers

The haulage problem is a vital one. The method of haulage used should be reliable and efficient—at a minimum up-keep expense.

The names of prominent users of Atlantic Electric Trucks suggest reliability, efficiency and economy of operation.

Whatever are your haulage requirements there is an Atlantic Truck especially designed to render unrivaled service under the most exacting conditions.

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Our Engineering Department will be glad to make estimates on costs of operation of its electric trucks under all conditions of service.

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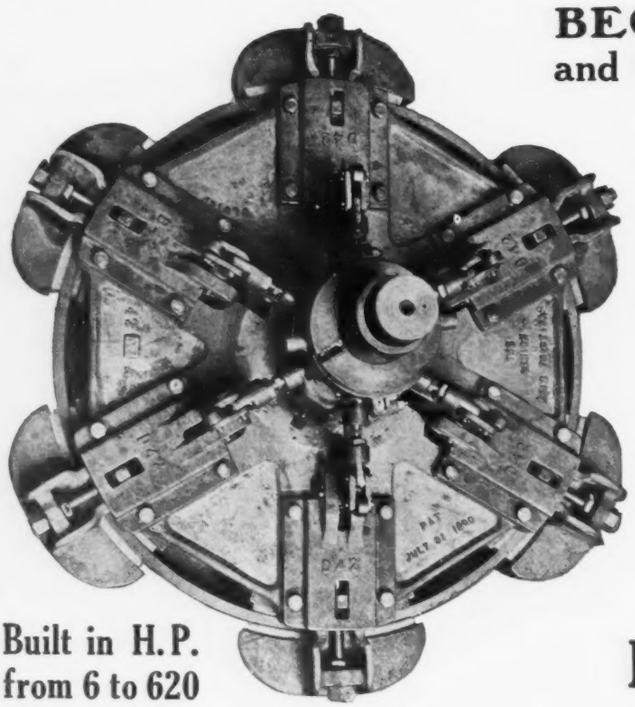

Built in H.P. from 6 to 620

BECAUSE—It is the Most Powerful and Convenient Clutch on the Market

This is true both because of its construction and because of the material we have put into it.

In regard to construction, we will note here a few of the most important features:

The Lehigh Clutch is a Rim Friction Clutch—the type that is recognized by the highest mechanical authorities to be superior to all other types. It has a positive action and grip. All adjustments are very simple. Each jaw can be adjusted independently of all the rest, thus insuring a firm grip on every shoe on the rim. The Wood shoe or friction block on any jaw can be removed without disturbing any of the other jaws or without removing the clutch from the shaft. Jaws are moved from the rim by positive active levers—no springs are used. All parts subjected to severe strains are made of Malleable Iron; the jaws are made of Semi-Steel and the spider of special mixture of iron.

The Lehigh Clutch is guaranteed to be the most reliable clutch made.

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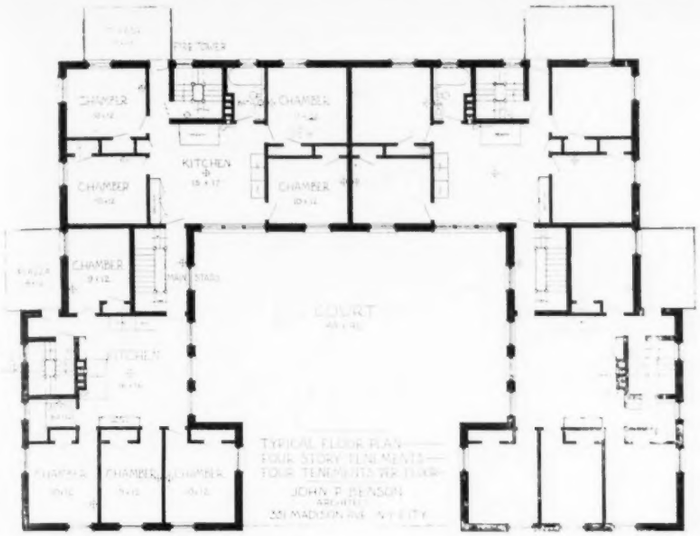
Write today.

Lehigh Clutch Works

CAMDEN, NEW JERSEY

quent repairs with their annoyance and expense. The trimming of the exterior, including the steps, is all of granite; copper is used for all flashing, and no outside gutters and leaders have been used, the roof water being carried down inside through heavy soil pipes. Every thought has been given to the comfort and safety of the tenants and it is believed that they are the last word in the problem of housing mill hands at minimum expense in the long run. John P. Benson, of New York, is the architect.



Malden Knitting Mills' New Plant

A GOOD example of modern knitting mill specially designed for the manufacture of sweaters, bathing suits and similar lines, is the new plant of the Malden Knitting Mills, at Malden, Mass., which was designed by and erected under the supervision of E. R. Simpson, 176 Federal Street., Boston, mill architect and engineer. Construction work was started in April and the company occupied the new building November 1. Facilities are provided for increasing the output of the concern about 100 per cent.

THREE-STORY MILL

The building is 150 by 40 feet, three stories and basement, of typical mill construction. The basement is full height and amply lighted for manufacturing if found desirable to use it for this purpose. Two entrances are provided, one at either end of the building and both from the street on which the mill fronts. The general office, private offices and show-room are arranged near the main entrance. The offices are stained dark mahogany and dado and walls to harmonize. The workers' entrance is fireproof from basement to roof and provided with ample exits through fireproof doors from the main building.

All sashes are of steel with ample ventilation, glazed with ribbed glass to provide subdued light in all parts of the building. Window heights are arranged to prevent shadows on the work tables and tables are placed to receive light from both sides of the building. The elevator is located in the corner of the building opposite the offices with receiving and supply rooms adjacent to eliminate all unnecessary travel in handling materials.

A rest room is provided on the third floor, where the larger part of the female help is employed, fully equipped with cot and first aid requirements to take care of minor injuries or any indisposition on the part of employes. A lunch room has also been provided for the employes who find it inconvenient to take their noonday meal at home.

POWER AND HEATING

The mill's system of heating is used with radiation placed under the windows throughout the new plant. The boiler plant is located at the end of the building opposite the work entrance with a coal pocket adjacent which has ample capacity. Fireproof partitions separate the heating plant from the main building and the entrance to the heating plant is from the outside. Electric power is used throughout and the plant is connected with lines of the public service corporation. General Electric motors have been installed. All lighting wires are in conduits in accordance with the national code for this work. In the design and construction of the building requirements laid down by the Factory Mutual Fire Insurance Companies have been met. In order to provide the maximum protection the sprinkler system is fed by two supplies.

The basement is used for the storage of yarns. The first floor is used as a shipping and stockroom and contains the offices. The second floor houses the stitching and finishing departments and a dining-room. The winding and knitting departments occupy the whole third floor.

Every attention has been given to the construction and equipment of a building specially adapted to the mill's needs and to provide for manufacturing under the most economical conditions with regard to the well-known quality of the concern's products and to arrange the departments in such a manner that the goods may be routed from one operation to another with no lost motion and to provide conditions of light, hygiene and comfort under which the employes could perform their work accurately and rapidly. All departments are connected by a telephone system and many other labor saving devices have been installed. The Malden Knitting Mills are owned and operated by Henry Feuerstein.

NEW MILL OF MALDEN (MASS.) KNITTING MILLS

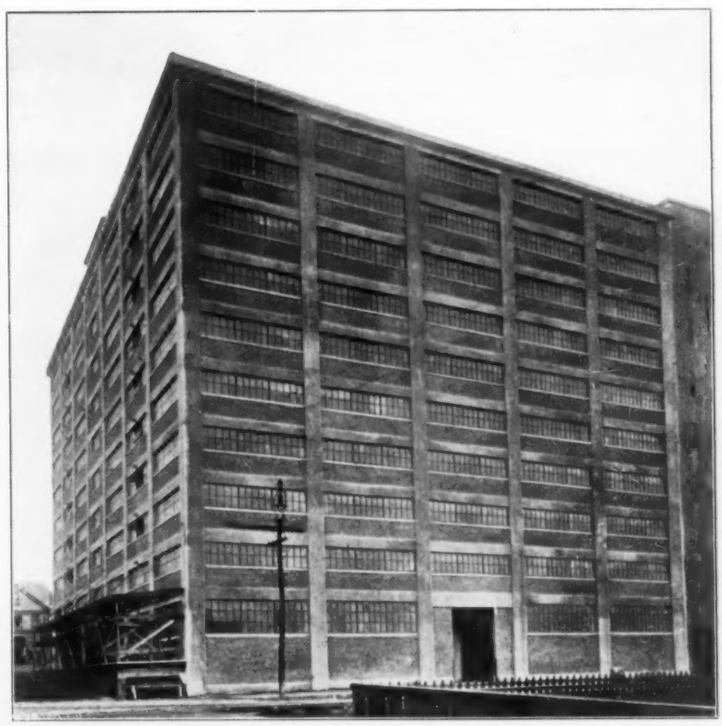
New Ten-Story Storehouse for Appleton Company

THERE has just been completed for the Appleton Company, Lowell, Mass., a new addition consisting of a 10-story storehouse which embodies the most modern ideas for providing safety from fire and ease in handling and storing material. The new storehouse is located next to the Bay State storage warehouse, and has a frontage on Jackson Street of 92 feet 8 inches and extends along Revere Street for a distance of 133 feet, with an "L" at the rear 17 feet 4 inches by 35 feet 6 inches. It is of fireproof construction throughout.

DETAILS OF CONSTRUCTION

The height of the first story is 13 feet 5 inches, and of the upper stories, 8 feet. It is of flat slab design of reinforced concrete construction in which all beams are eliminated. All doors, both inside and outside, are tin-covered, and no wood is exposed anywhere in the building. The windows have Lightwell steel frames and sashes, made by the Lightwell Steel Sash Co., Wilmington, Del., and wire glass made by the Highland Glass Co., Washington, Pa. The walls are of panels below the widows, supported at each floor by a concrete belt course and are of a very fine quality of sand struck brick outside, with white sand lime face brick inside. The walls fill the entire panels on all but the street sides, and in the opinion of experts there is no doubt this building would stop the progress of a conflagration.

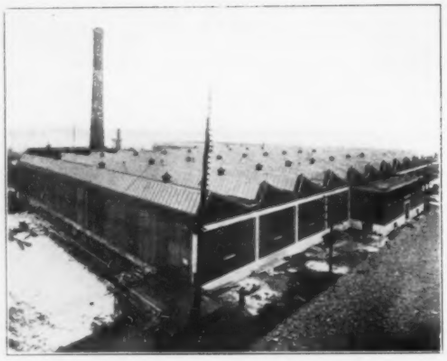
An elevator 9 by 12 feet, furnished by D. B. Maclary & Son Co., Boston, Mass., is enclosed within reinforced concrete walls, and the concrete stairs are protected by a separate similar enclosure. Sprinklers satisfactory to the Factory Mutual Insurance Companies are installed throughout, and all floors are pitched slightly to Revere Street side where scuppers are provided at each floor.



NEW REINFORCED CONCRETE STOREHOUSE OF APPLETON CO., LOWELL, MASS.

NOTABLE CONSTRUCTION RECORD

The lot where this building now stands was not cleared of the former structures until the middle of July, and the contractors delivered the building to the owners on November 13, making a notable record for the construction of a building of this size. The building was



NAUMKEAG STEAM COTTON COMPANY

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An examination of our books will show you that the concerns employing us have the price to buy the best: also that they give us repeat orders. Can you afford less than the best?

NEW ENGLAND WASTE COMPANY

NEW ENGLAND CONCRETE CONSTRUCTION CO.

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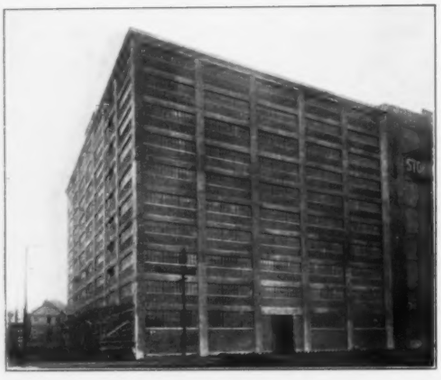
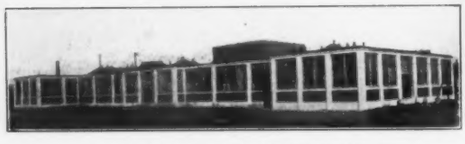
Specialists in Mill and Factory Construction

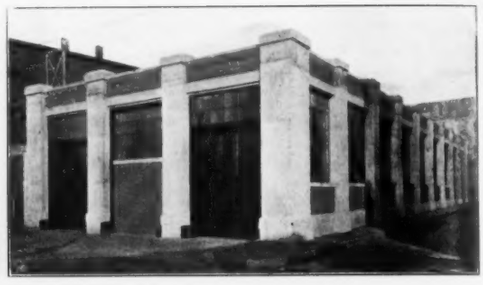
FIREPROOF OR SLOW BURNING



APPLETON COMPANY



MERRIMAC CHEMICAL COMPANY



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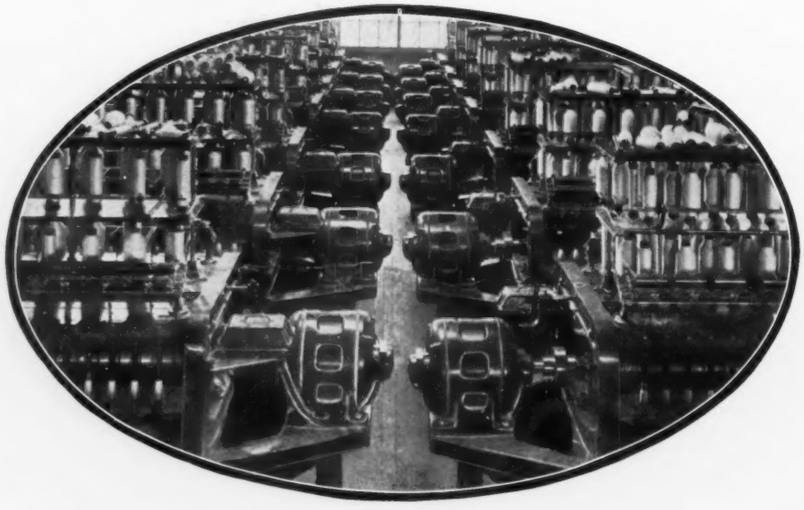
Motors That Are Built to Last

Motors
Generators
Transformers



In all sizes
In all types
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Crocker-Wheeler Company, Ampere, N. J.

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San Francisco
Syracuse

designed and constructed by the New England Concrete Construction Co., of Boston, who have made a specialty of factory and warehouse construction for the heads of the company, thus giving literally personal superintendance. The work of this organization consists of factories, mills, storehouses, coal pock-

STOREHOUSE OF APPLETON CO. DURING CONSTRUCTION

several years. While with the Eastern Expanded Metal Co., the engineers now organized as the New England Concrete Construction Co., had charge of the design and erection at Salem of the storehouse of the Naumkeag Steam Cotton Co. that passed through that terrible conflagration without even scorching the contents.

The policy of these contractors has been not to take more contracts at a time than can be carefully watched by

ets, etc. The Appleton Company manufactures and finishes white and colored flannels and ginghams on 85,000 spindles and 3,000 narrow looms. F. E. Dunbar is president, A. G. Cumnock is treasurer and F. A. Bowen is agent. Catlin & Co., New York and Boston, are the selling agents. This company is very successful and recently declared a substantial stock dividend, increasing the capital stock to a figure more representative of the amount of the capital.

Goodyear Tire Fabric Mill Increases

THE new addition to the Killingly plant of The Goodyear Tire & Rubber Co. consists of a two-story brick and steel building, 168 feet by 150 feet, inside measurements. The building is divided into seven 24-foot bays, east and west, and five 30-foot bays, north and south. The south wall is temporary, and the steel work is designed so that in the future more bays can be added.

The first floor consists of the usual tar and gravel concrete and three inch hemlock plank with 13/16 inches by 2¼ inches factory maple flooring on top. The first floor structural steel columns are incased with concrete and are also provided with corner protectors. The 30-foot bays on the first floor are divided into two 15-foot bays by secondary columns, that run up to the second floor only. The ceiling and the structual work, supporting the second floor, is fire-proofed by plaster boards and fireproof plaster.

The second floor setting consists of 24 inches, 80-pounds steel I beams, 24-feet in span for floor girders, and 10 inches, 25-pounds I beams 15 feet long, 6 feet center to center for floor beams. The floor itself varies from the usual 4 inches plank floors in that it is made of 2 by 4 laid on edge and spiked together. Care is taken to break all joints. The second floor is finished with maple, same as the first floor, and is designed to carry 200 pounds per square foot of live load.

The roof is of the saw-tooth type of construction with steel trusses. The roof proper is made of 2 by 6 matched yellow pine, covered with one layer of hair insulator and a five-ply tar and slag roof, all flushings being of 16-ounces copper.

Fenestra sash with ¼ inch wire glass was used throughout covering 60 per cent. of the wall area, with 30 per cent. ventilation. Saw-tooth sash is six feet high and is continuous in the 168 foot length. The sashes are provided with hinges for additional ventilation and all condensation on the inside of the sash is taken care of by continuous copper gutters.

The building is provided with a three-ton Haughton elevator, which is located between the new building and the old Number 3 mill. This elevator connects the four floors of the old mill with the two floors of the new addition.

The first floor is divided with fire proof partition into cotton storage rooms, yarn storage room, opener room, and a winding room. The second floor is partitioned into a weave shed with space for eighty-four 90-inch individual motor driven looms, a cloth inspection room and a testing room. The first and second floors are connected with an outside and an inside stairway, besides the elevator.

The building is equipped with Grinnell sprinklers, vacuum steam heating system, and G. M. Parks turbo system of humidity. All machinery will be electrically driven. The present buildings will be operated strictly as a yarn mill, furnishing yarn to the new weave shed. Eighteen spinning frames, 276 spindles each, 12 additional cards, two pairs of intermediates, 6 pairs of fine frames and additional cloth room machinery will bring the capacity of the mill to 44,000 pounds weekly of combed Sea Island yarn. Sixty thousand pounds more weekly will be bought in the open market, bringing the total capacity of the mill to over 100,000 pounds of first class tire fabric, all of which will be used in Goodyear tires.

Ground was broken for the new building on the 12th of October, and cotton storage started on the 13th of December. The addition will be in full operation by March 1st, on a night and day basis.

The design and construction was in charge of the Engineering Department of The Goodyear Tire & Rubber Company, under the supervision of Mr. E. T. Richards, C. E. F. W. Litchfield is president of the mill; W. E. Palmer, treasurer; W. I. Bullard, asst. treasurer; R. W. Boys, general manager.

New Nashua Storehouse

By W. R. Sides

THE new reinforced concrete storehouse for the Nashua Manufacturing Company, at Nashua, N. H., is one of the most notable buildings recently erected for the textile industry of New England. This building is entirely of reinforced concrete construction of the flat-slab type, and this is the first such building erected for this concern, whose plant has formerly consisted almost entirely of buildings of the mill-construction type. The selection of reinforced concrete by this nationally known concern is indicative of the change of attitude of the textile industry toward the use of this material for their new buildings.

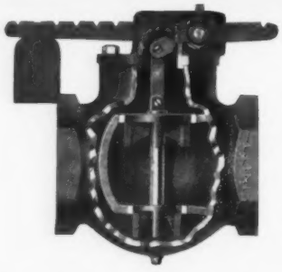
This building—nine stories in height, 320 feet in length and 160 feet in width—is a splendid example of the advantages reinforced concrete offers to the industrial executive, both in regard to cost and time of erection, as compared with other forms of construction. On definite bids, compared with mill construction, reinforced concrete was slightly cheaper, while compared with fireproofed structural steel the difference was about 15 per cent. in favor of reinforced concrete. It was not only possible to effect this saving in first cost, but it was also possible by the use of reinforced concrete to obtain a much better ultimate investment when insurance, depreciation, sanitary qualities and other items were taken into consideration.

BUILT IN TWO SECTIONS

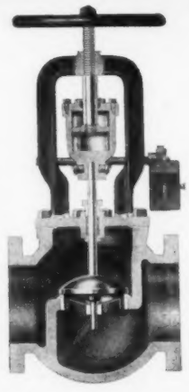
It was necessary to construct this building in two sections in order that

SECTION OF NASHUA MFG. CO.'S STOREHOUSE IN THE COURSE OF ERECTION

Save steam



Do it automatically



DAVIS *VALVE SPECIALTIES*

Reducing Valve

Your boiler pressure is quite often too high for certain purposes. You want a lower pressure that will be constant regardless of fluctuations in the boiler pressure.

Put the job up to a Davis Reducing Valve. This automatic device saves steam by delivering the exact amount required and no more.

It is a piston type of valve the principle of which is the balancing of pressure by counter-weights. It has no packing, diaphragm, springs, or toggles. By using the proper amount of counter-weight it may be set for any desired service pressure.

Put your mill on an efficiency basis Use steam at the required pressure which may not be the boiler pressure.

Back Pressure Valve

The exhaust steam from a non-condensing engine is a valuable by-product which may be used to good advantage for heating, drying, cooking or other purposes that local conditions may suggest.

A Davis Back Pressure Valve is the device you need for this purpose. It has a semi-balanced piston disc that operates noiselessly without injury to the seats. It will not pound. A small counter-weight is all that is required to maintain any reasonable back pressure.

A feature of this valve is the construction of the seats and disc which is such that expansion will not cause the disc to stick or bind.

Stop and Check Valve

No boiler plant is free from the danger of a serious accident unless each boiler is equipped with a good Stop and Check Valve.

Dependability is the principal feature of the Davis. It is as simple in design as any common stop valve. The outside oil dash pot eliminates all possibility of sticking. The indicator or tell-tale enables you to see it work. And you can test it by hand. You always know that it is ready to act in an emergency.

When buying a safety device such as a stop and check valve, your first consideration should be dependability. Unless it works—always—regardless of conditions it is of little value.

Send for complete catalog of Davis Valve Specialties for the automatic regulation of pressure

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Valve specialty manufacturers since 1875

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For 30 years "Just a little bit Better"

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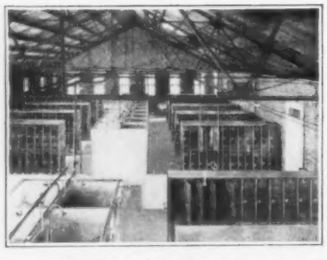

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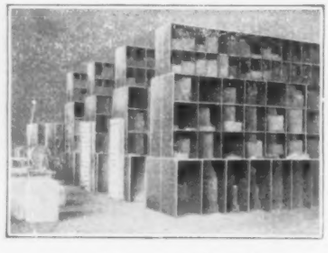
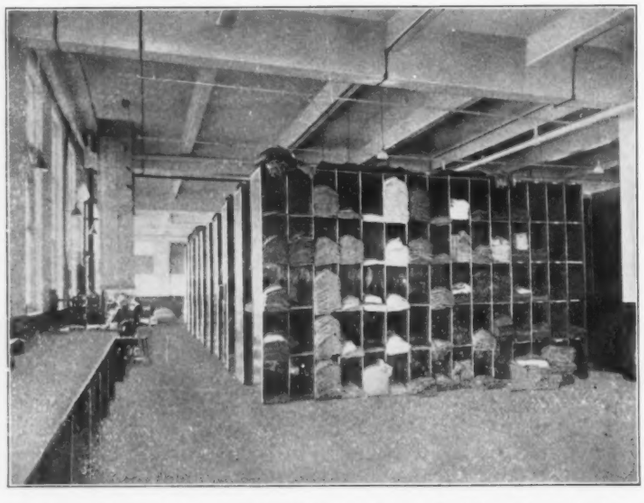


Speer Carbon Co., St. Marys, Pa.



Bernstein Steel Adjustable Shelving and Steel Tables installed at Freeland Overall Co., Freeland, Pa.

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EFFICIENT--PRACTICAL--ECONOMICAL

A service department is maintained at your disposal, fitted to give valuable suggestions, proposition drawings and estimates on your own individual particular requirements. Let us show why it is real dollars and cents to you to adopt Bernstein Steel Equipment. **If you are keeping in step with efficient Factory Equipment you will want to investigate.**

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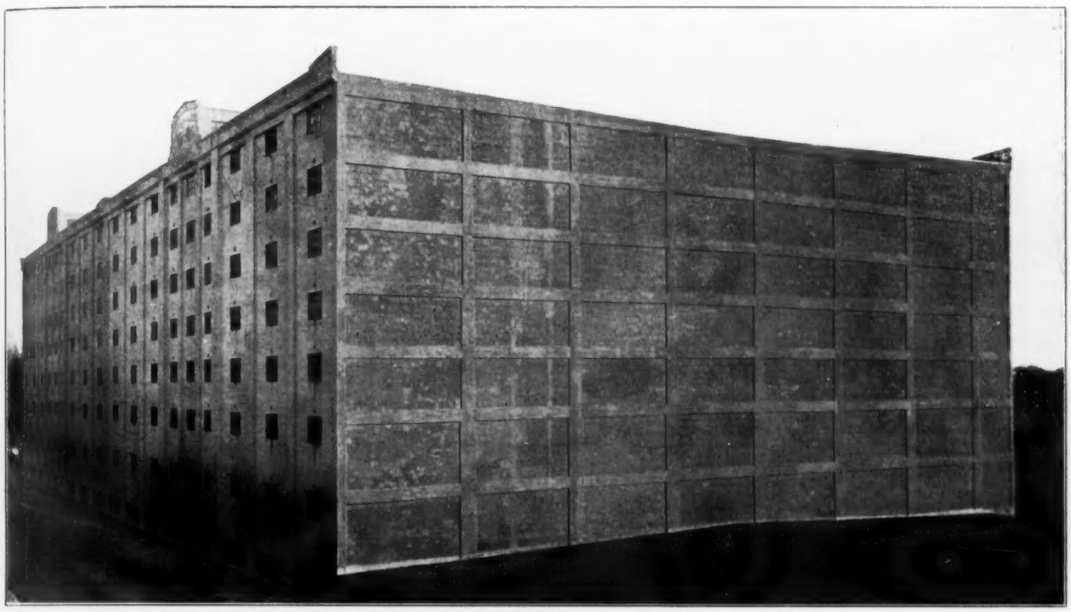
the Nashua Manufacturing Company could occupy the building on the site of the second section while the first section was under construction. This was very desirable also from an economic standpoint, as it was possible to obtain a more economical building by the use of form lumber a maximum number of times, instead of nine if the building were built in one operation.

On April 24, 1915, excavation was started on the first section, and on August 14 the roof of this section was



NEWLY COMPLETED STOREHOUSE OF NASHUA MFG. CO.

completed — three months and three weeks to excavate, construct footings, and to roof out on a nine-story building. The owners in the meantime had occupied several floors for storage purposes. The reproduction of the photograph taken on August 14, 1915, gives some idea of the rate at which this structure progressed, the skeleton proceeding oftentimes at the rate of a story in five days.

The date in the contract for the completion of this building was January 15, 1916. On December 13, 1915, the date on which the picture of the finished storehouse was taken, the building was entirely completed and all contractor's men were removed from the job. This building was therefore completed one month and two days ahead of contract.

BRIEF DESCRIPTION OF BUILDING

This storehouse, comprising 9 stories, 320 by 160 feet, will be used for the storage of manufactured cotton goods, except the first story, which is 16 feet floor to floor. This will be used for finishing, packing and other purposes. The building throughout is designed for a live load of 150 pounds in addition to the dead weight. The story heights vary, but the typical heights are 12 feet and 9 feet 8 inches, floor to floor; typical bays are 20 by 20 feet, with a 7-inch slab with two-way flat-slab system of reinforcement; floor finish monolithic, figured structural as a part of the floor. There are two large elevators, 9 feet by 11 feet 8 inches; solid steel sash with rough wire glass; curtain walls at both ends of buildings constructed of hollow tile, with the idea in mind of extending this building, consisting at present of two units, two units in each direction. The shipping facilities are exceptionally good, with a railroad siding adjacent to the building for its entire length.

This building was constructed for the Nashua Manufacturing Company, under the direction of C. R. Makepeace, architect and engineer, Providence, R. I., by the Turner Construction Company, of New York City.

New Bedford Warehousing Facilities

MANUFACTURERS in southern New England have been watching with interest the completion of the new Merchants' Terminal Warehouse which has been erected on the water-front at New Bedford, and is now practically ready for occupancy, for with the completion of this warehouse there will be in New Bedford storage opportunity under the most modern conditions for 60,000 bales of cotton at one time. To make New Bedford a spot cotton market of considerable proportions, with an ambition eventually to make it the greatest spot cotton market in New England, is the object of the corporation, which is composed almost exclusively of cotton mill men. Southern growers and dealers have visited the city during the past winter to confer with brokers and mill men regarding the facilities now offered by the completion of this warehouse and those interested in the local cotton industry can see little reason why New Bedford ought not to develop speedily into a spot cotton market of real magnitude.

PERSONNEL OF CORPORATION

The present structure is nine stories in height, fireproof and equipped throughout with every modern mechanical apparatus for quick handling of merchandise. It cost, with its site, approximately $225,000. The corporation which is building it is headed by Abbot P. Smith and William M. Butler, two of the best known mill promoters and mill directors in New England, and follows quickly upon the erection a short time ago of the plant of the New Bedford Storage Warehouse Co., by a corporation containing these two and a number of other mill men, practically all of whom are associated with Mr. Smith and Mr. Butler in the erection of the Merchants' Terminal. The latter building may be said to be the second step in the scheme to make New Bedford the big spot cotton market of New England.

ADVANTAGEOUS LOCATION

The Merchants' Terminal Warehouse is adjacent to the new pier which juts 125 feet out into the river, and which is being built from a large appropriation made by the State of Massachusetts. When this pier is completed New Bedford will have one of the finest plants of the kind along the Atlantic Coast. The pier will accommodate at one time a group of big coastwise steamers. With modern apparatus for unloading, cotton could be handled with unusual quickness, and it is but a very short haul to the terminal warehouse, where there is, of course, railroad yard facilities for trans-shipment. Within a very short distance along the water-front is the daily line of freight steamers to New York. The inland railroad freight facilities from New Bedford are unusually fine, and New Bedford to-day is the distributing point for coal for a great section of New England. Coal steamers and barges come here from tidewater ports where the coal is loaded, and at New Bedford wharves it is trans-shipped into cars for distribution through New England. If coal can be so handled, there ought to be the same opportunity for cotton, New Bedford mill men have argued, and accordingly the New Bedford Storage Warehouse first, and then the bigger terminal warehouse, have resulted.

New Bedford's water-front has given promise of developing commercially faster, perhaps, than any other New England port save Boston. Men in other lines of commerce have been quick to realize this and have made their plans accordingly, and the big mill men of the city have seen to it that the textile industry keeps pace with the opportunities offered by harbor improvement.

STRUCTURAL FEATURES OF BUILDING

This warehouse is the first large reinforced concrete building ever erected in New Bedford. The facilities for handling merchandise are excellent, with a railroad siding running under the rear of the building for its entire length. On the side opposite the railroad there is an inside driveway and shipping platform for handling local business. Elevator service is more than adequate; there are three in all, two 11 by 8 feet, and one 12 by 20 feet, all of average speed and running from the first floor to the ninth. After a careful study by the engineers of the most economical way of handling goods, these elevators were located near the center. A whip hoist is located in one corner of the building adjacent to the shipping platform, by which material in bales of light character can be more quickly handled than by elevators.

This structure is nine stories in height, 158 by 110 feet, is located at Front and Elm streets, and the N. Y., N. H. & H. R. R. tracks, and is entirely of reinforced concrete construction of the flat slab type. The foundations are of concrete piles and the floors are designed for a live load of 175 pounds in addition to the dead weight. The first story is 12 feet and the rest are 10 feet, dimensions given floor to floor; the floors are of granolithic finish, placed monolithic with the slab and figured as a part of it. All sash is of solid steel and the doors to elevators, stairs and platforms are of standard fireproof makes. A typical bay is 19 feet 10 inches by 21 feet 3 inches, center to center of column, with a 7¾-inch floor slab carrying a two-way system of flat slab reinforcement.

This structure, which is now practically completed, has been erected for the Merchants' Terminal Warehouse Co., of New Bedford, under the direction of Lockwood, Greene & Co., architects and engineers of Boston, by the Turner Construction Company of New York and Buffalo.

NEW BUILDING OF MERCHANTS TERMINAL WAREHOUSE, NEW BEDFORD

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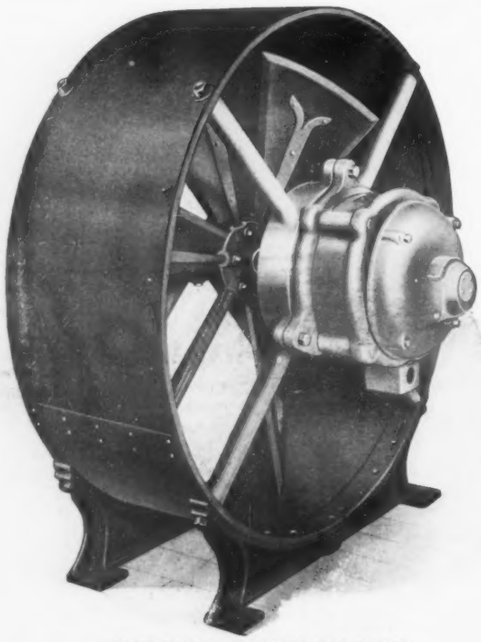

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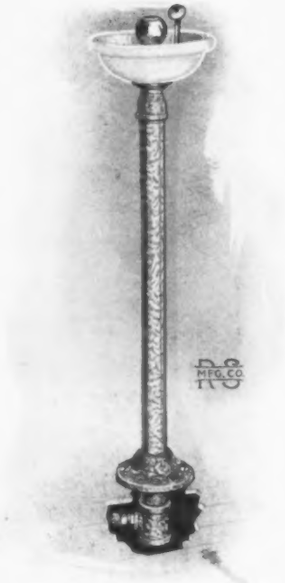
Kansas threw out the common cup in 1910



Other states and cities have followed.

TYPHOID, DIPHTHERIA AND PNEUMONIA are some of the diseases communicated by the common drinking cup.

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New Building for Rhode Island School of Design

THE new building for the textile department of the Rhode Island School of Design on North Main St. has been completed, after several months' work, and was dedicated December 29, 1915. The building was given to the school by Stephen O., Jesse H. and Manton B. Metcalf.

The new home of the department of textiles is a notable addition to the institution. It is constructed of smooth red brick, with limestone trimmings, having a frontage on North Main St. of 162 feet and being 60 feet deep. It is practically five stories high and contains the most modern features of factory construction.

The plans were drawn by Day & Klauder, of Philadelphia, for a building which extends from a few feet north of the Providence-Washington Insurance Company block to and including the land occupied by West Hall. For the present, however, West Hall, which is serving a useful purpose, will be left untouched, but provision will be made for further extending the textile building at some future time.

ARCHITECTURAL FEATURES

While the building has been designed primarily for use, its architectural beauty has not been sacrificed. The exterior pressed brick walls rest upon a limestone base, the monotony of the red brick being broken by a limestone course midway up the building and a cornice of the same material. The corners of the building have a panel effect in red brick.

The front of the building is made up of bays 20 feet wide, 14 feet of the space being glazed, admitting an unlimited supply of daylight. The roof is of slag on concrete. The building has metal doors, double hung metal windows, and is of fireproof construction throughout.

ARRANGEMENT OF DEPARTMENTS

The main entrance on the southwest corner opens into a vestibule leading to the staircase hall in the middle of the south end of the building. This hall, in which the elevator is located, extends upwards through all floors. It is finished in Kittanning brick and is shut off from adjoining rooms with fireproof doors. Fronting the street on the first floor is the dyeing room. This has a tile floor and the walls are of painted brick. In the rear are rooms for the chemical laboratory, one for the elementary and one for the advanced class, separated from the rest of the rooms on this floor. In the southeast corner is a lavatory, and adjoining it a special fire tower, to which, on the upper floors, access is gained through balconies and which is completely shut off from the inside of the building.

The second floor is devoted to class rooms. In the corner over the vestibule there is a spacious office and library, in which are kept books needed in the routine work of the department. Extending northward from the staircase hall in the middle of the building a corridor divides the floor. On the street side are class rooms. On the opposite side of the corridor are two large rooms devoted to free-hand drawing and machine models.

On the third floor the entire space not occupied by the staircase hall, lavatory and fire tower is utilized as a weave room. This is 100 feet long by 60 feet deep, and affords ample room for the instruction of 60 students at one time. The fourth floor is a duplicate of the third, and contains the spinning department. Throughout the building the equipment is driven by electricity, each machine being equipped with an individual motor.

With the new building completed, the textile department possesses ideal facilities for teaching this course. It has an excellent equipment of dobby looms for cotton, worsted and woolen weaving; jacquard looms for cotton and silk fabrics, warp preparation equipment, hand looms, and a full complement of cotton machinery, the greater part of which has been donated by Rhode Island manufacturers. The course in textiles aims at training

NEW TEXTILE DEP'T BUILDING OF RHODE ISLAND SCHOOL OF DESIGN

students to become efficient in the designing and manufacturing of fabrics, an effort being made to meet as far as possible the special requirements of the textile industry in Rhode Island.

STARTED BY PUBLIC-SPIRITED WOMEN

From a modest experiment, started by a small coterie of public-spirited women a generation ago, the School of Design has had a steady, sturdy growth, and although it has received only modest support from the state and city, it has kept abreast of many schools of its kind in other states which have been established and maintained by appropriations of the public funds. From a few rooms in the Hoppin Homestead building, where the experiment was first tried, the school, through the generosity of local friends, has been made one of the most important and most useful educational institutions of the state. Its several departments, its museums, halls and laboratories are comfortably housed in half a dozen large buildings occupying the greater part of the area bounded by Waterman, Benefit, College and North Main Streets.

Because of its somewhat limited income the School of Design has been restricted in its work of serving the public. It depends for its support upon tuition fees, somewhat modest appropriations from the city and state, which are used largely in scholarships, and scholarships maintained by a few organizations and individuals.

HAS HAD STEADY GROWTH

But a lack of means has never been permitted to check its development. Whenever there has been an imperative demand for more room to relieve crowded conditions or to provide otherwise for increasing its usefulness, loyal friends and those who appreciate its worth have come forward and have contributed generously toward the necessary buildings and equipment.

A typical illustration of the way in which courses have been developed is afforded in the establishment and growth of the department of textile design, for which the new building has been erected. A little more than a decade ago a committee of men prominent in the textile industry was appointed to study the needs of the community in regard to textile education. The committee consisted of Jesse H. Metcalf, Henry F. Lippitt, Thomas B. Owen and W. B. Smith. Later Robert W. Taft, Charles Sisson and James R. MacColl were added.

That there was urgent need of the instruction suggested was very evident. The other departments of the school were somewhat crowded for room, but, following its policy of supplying the need of the community, the School of Design decided to add a course of textile design to its curriculum. The needed room was provided through the generosity of Stephen O., Jesse H. and Manton B. Metcalf, who purchased the old Congregational Church on Benefit Street, remodeled it, and donated it to the school in 1903. The textile department was located in the basement of that building, sharing floor space with the class in modeling.

That the school has made no mistake in offering the course was proved by the large number who applied for instruction. Before any machinery had been installed the registration of the class was 30. The second year 42 students were enrolled and an assistant instructor was added. The first graduates were given diplomas in 1906. At that time the demand for instruction in textile design had become so great that the modeling class was crowded out. Textile chemistry and dyeing were added to the textile course, making it complete.

MANUFACTURERS SHOW APPRECIATION

The interest of the large manufacturers of the state had been aroused in the work, and their appreciation of the efforts of the school was expressed in the tangible form of machinery and donations of yarns and other materials.

Each succeeding year brought a constantly increasing number of students. In the summer of 1909, to provide space for needed expansion of this and other departments, Jesse H. and Stephen O. Metcalf donated the building at 35 North Main Street, now known as West Hall. There the textile chemical laboratory was located, but it was generally recognized that it would be a matter of only a few years before more room would be needed.

In 1914 the enrollment was 121, and the trustees were again confronted with the problem of providing room. This difficulty was solved when Stephen O., Jesse H. and Manton B. Metcalf volunteered to give the new building which has just been dedicated.

While the great majority of the students enrolled are residents of Rhode Island, the worth of the school has been recognized by many who live outside of the state. With the addition of the new building the facilities for instruction will be greatly augmented, and the institution will become more valuable to the community under the able direction of L. Earl Rowe, director; Arthur F. Ferguson, head of the textile department, and a competent staff of instructors.

Thomaston Cotton Mills Increase

THE Thomaston Cotton Mills, Thomaston, Ga., large manufacturers of sheetings, duck, wide drills and yarns, have erected large new buildings and are adding 30,000 spindles with the accompanying preparatory machinery and looms to weave wide cotton sheeting. This will make the Thomaston Cotton Mills one of the finest mills in the South, with a total of 50,000 spindles. J. H. Mayes, of Charlotte, N. C., is the engineer in charge of the development, which also includes the electrification of the entire plant.

DETAILS OF BUILDINGS

The new buildings are known collectively as Mill No. 2 and include a main building, 400 feet long, 128 feet wide, two stories high and basement to which is attached a picker room, 50 by 50 feet, and an annex, 240 feet long by 75 feet wide. This main building of Mill No. 2 is connected by the annex to Mill No. 1, which is 400 feet long by 75 feet wide and also has an annex 120 by 75 feet. The whole plant is under one roof and has a frontage of 570 feet. In the center of the annex to Mill No. 1, between the two main buildings, is the cloth room, 170 feet long by 70 feet wide, which will take care of the output of both mills.

The new equipment includes picking and carding machinery from the Saco-Lowell Shops, drawing and roving frames from the Woonsocket Machine & Press Co., spinning frames from the Fales & Jenks Machine Co., spoolers from Easton & Burnham Machine Co., warpers from T. C. Entwistle Co., Cohoes slashers, Draper looms and Curtis & Marble Machine Co. cloth room machinery. Fire protection equipment in the new buildings has been supplied by the General Fire Extinguisher Co.

The old steam power plant has been

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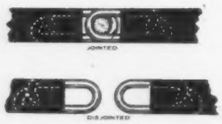

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The "Clipper" can be carried to the broken or stretched belt, set on the floor or a box and the lacing done in *three minutes*, without removing belt from shaft.

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30 Days' Trial

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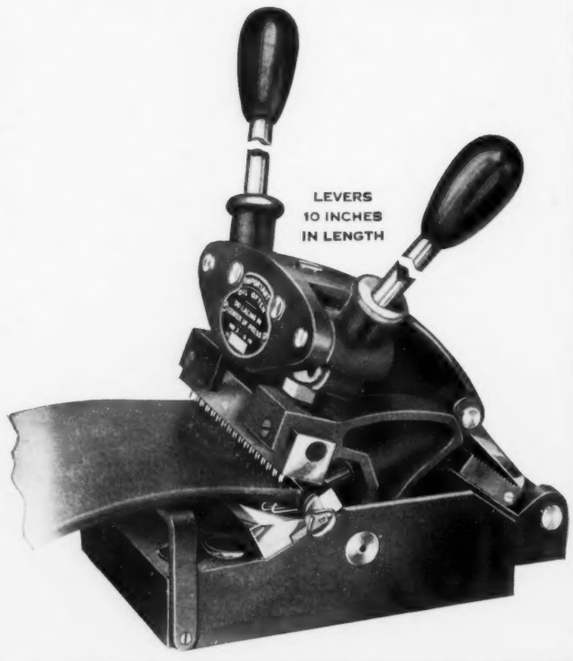

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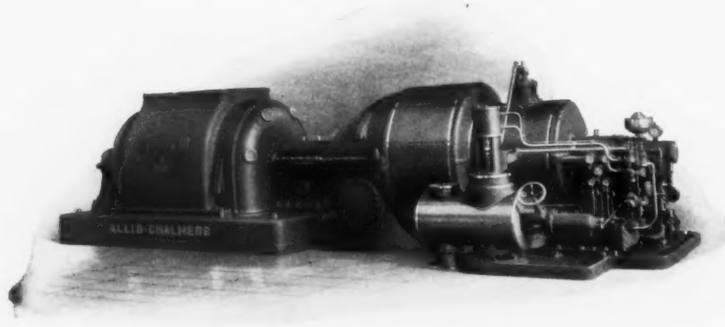

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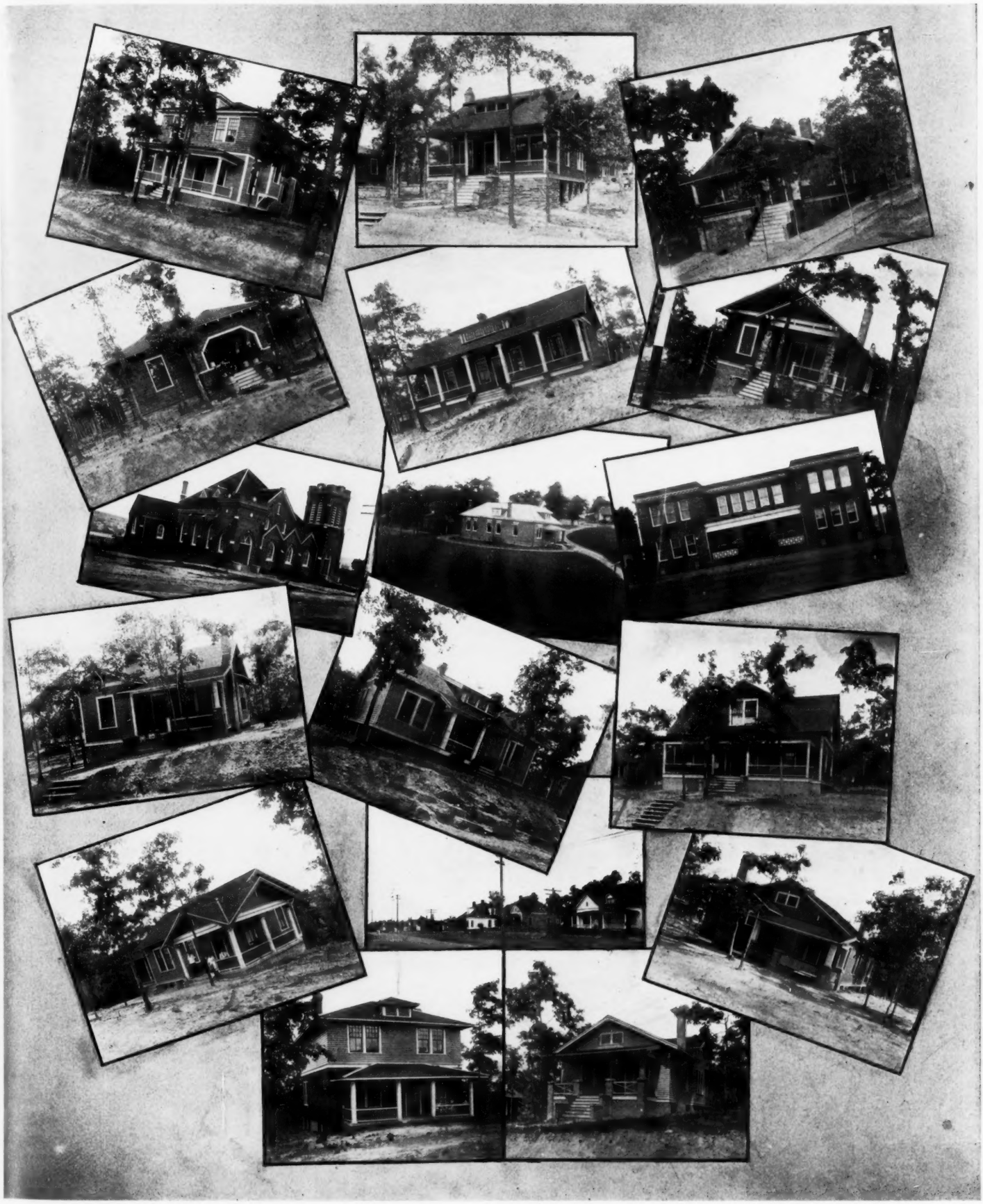

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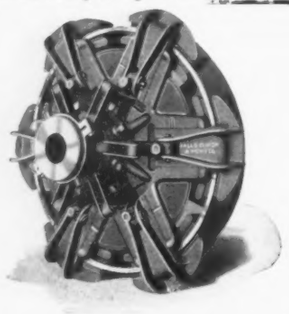

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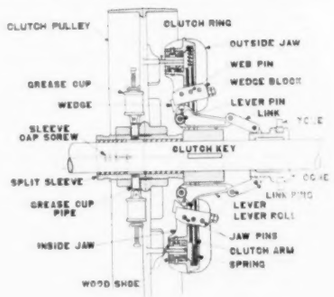

Sectional View, Friction Clutch Pulley.

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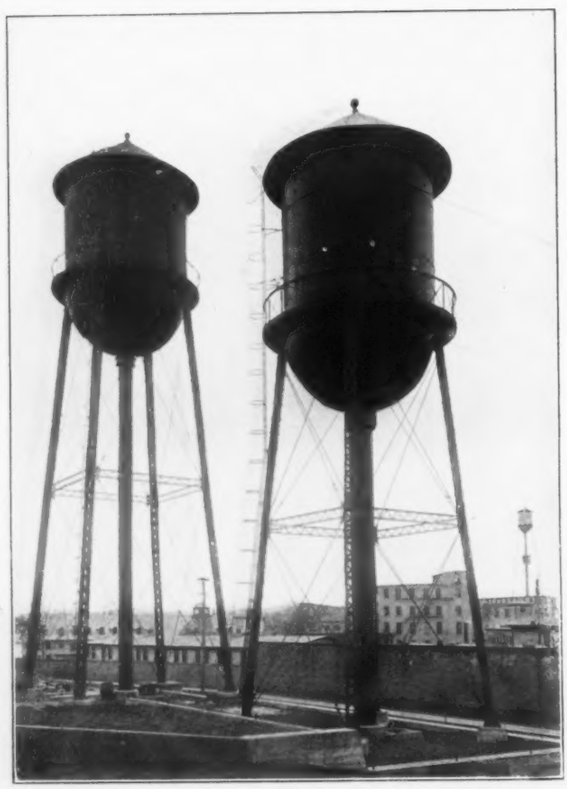

Looking at tank on left hand: Sanford Mills, Sanford, Me. Capacity, 30,000 gallons. Height, 54' 10" top.
Tank at right, in foreground, as follows: Sanford Mills, Sanford, Me. Capacity, 50,000 gallons. Height, 76' 9" top.
High tank in background; Goodall Worsted Co., Sanford, Me. Sprinkler tank capacity, 50,000 gallons. Service tank, capacity, 10,000 gallons. Height, 159' 0" top.

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Steel Water Tanks

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Steel tanks do not rot, burn or burst.

Steel tanks always remain absolutely water-tight.

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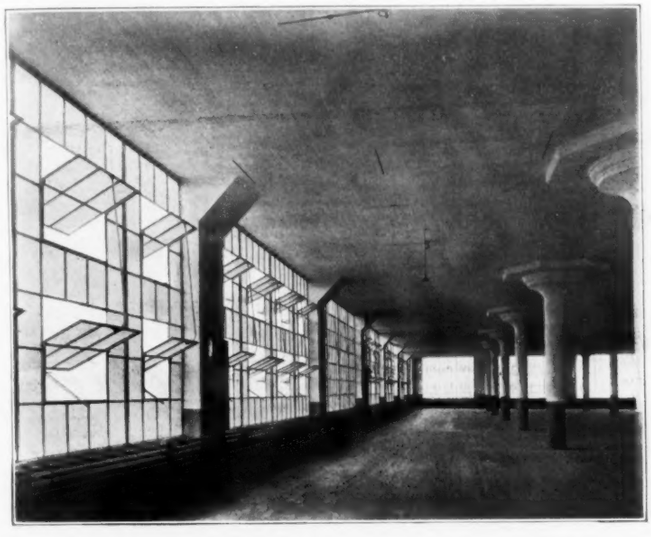
The Botany Worsted Mills

REINFORCED concrete construction as applied to textile mills gained one more notable example of success during 1915 by the completion of the five-story weaving mill of the Botany Worsted Mills, at Passaic, N. J. This structure, erected by the John W. Ferguson Co., New York, and Paterson, N. J., meets the requirements of structural rigidity to prevent vibration, unusually large live floor load of 150 pounds per square foot, and maximum natural light.



INTERIOR OF BOTANY WORSTED MILLS NEW WEAVING MILL. NOTE SASH TO FULL HEIGHT

DETAILS OF DESIGN

The five stories measure 16 feet each in height, with the exception of the top story, which is 17 feet, and the basement, 9 feet, 6 inches. The building measures 134 feet by 14 feet, 8 inches, aside from the stair tower. The bays are 25 feet in one direction, and 23 feet in the other. The exterior shows concrete pilasters rubbed down with cement grout, the wall panels being veneered with brick, which material also is used upon the corners. The stair towers have brick walls and reinforced concrete landings.

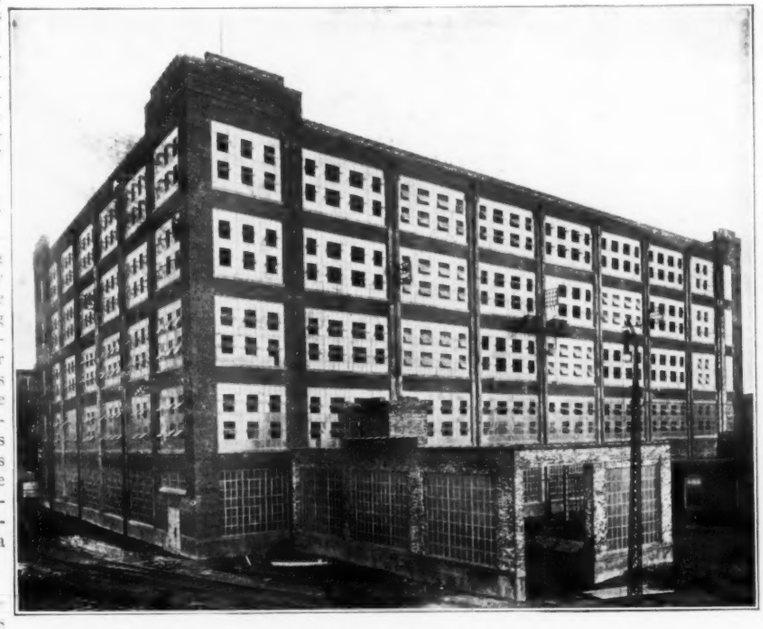
In the design of the column, the type known as the Grey Column was decided upon as being best suited for the purpose owing to the fact that reinforcing rods could be run through it with very little amount of displacement of the steel rods around the columns, insuring maximum diameter. The concrete encasing the columns was not figured for any stress. The load from the panels was assumed to be carried direct to the steel columns on the channel iron brackets placed at the top of the column as shown in the illustration. This makes it possible for the concrete encasing the column, and also the core, to be damaged by fire and water and yet not affect the stability of the structure as a whole.

CAREFUL ATTENTION TO LIGHT

The question of light was given careful consideration. A maximum was provided on the assumption that too much could easily be reduced, but too little could be remedied only at heavy expense. In all cases where possible, the upturned lintel was used—the wall beam being thus placed above the ceiling line. The steel sash was carried right up to the line, resulting in a percentage of sash area to the area from floor to floor reaching the somewhat unusual figure of 72. In order to secure as even and penetrating distribution of light as possible, ribbed glass panes were used. This prevents glare in the bays adjacent to the walls and insures ample light in the center bays.

The basement floor was composed of a concrete base with a one-inch cement top finish made up of one part cement, one part sand and one part Cow Bay grit. Upon the reinforced concrete floors above the basement was placed one inch of tarred sand underlying a 3-inch hemlock sub-floor and ⅞-inch maple top flooring. This system has proved very satisfactory in operation, as it removes the objection of operatives working on a cement floor and at the same time furnishes a secure fastening for the machinery.

The Botany Worsted Mills have capital stock of $3,600,000 and manufacture fine worsted and woolen dress goods, men's wear and yarns.



NEW FIVE-STORY REINFORCED CONCRETE WEAVING MILL OF BOTANY WORSTED MILLS, PASSAIC, N. J.

The White Mills of New Hampshire

ON March 5, 1915, Nelson D. White and Joseph N. White, Jr., well known as successful manufacturers of colored cotton goods, purchased from the Union Manufacturing Co. the plant located at West Peterboro, New Hampshire, which had been lying idle for several years. Extensive improvements have been made in the plant and it has been equipped with new machinery and is operating under the style of the White Mills of New Hampshire. The property consisted of Mill No. 1 and Mill No. 2, aggregating 100,000 feet of floor space. Mill No. 1 was built of brick in the year 1820 and was thoroughly reconstructed about ten years ago so that it is in first-class condition. Mill No. 2, which was also built of brick in 1856, has been thoroughly reconstructed. The weaving shed, dye-house and cloth-room buildings were erected about ten years ago. All of the buildings are equipped with a modern sprinkler and hydrant system. There are thirty-six tenements owned by the firm and 350 acres of land covered in part by a growth of old timber.

POWER DEVELOPMENT

During the past year a dam of concrete, 225 feet long, has been constructed across the Nubanusit River about 1,100 feet above Mill No. 2, and a thoroughly modern system of water wheels inaugurated, which will develop approximately 1,000 horsepower. The fall of the river is 115 feet. The natural flow of the stream is supplemented by reservoirs, aggregating 2,200 acres. The power development was built by the Holyoke Machine Company of Worcester, and the Fiske-Carter Construction Co., of Worcester, and provides for economical power in any quantity wanted.

MACHINERY EQUIPMENT

The entire plant has been equipped with the most modern machinery, built by the Saco-Lowell Shops, the Whitin Machine Works and H. W. Butterworth & Sons Co., of Philadelphia, Pa., and includes 12,000 spindles, 400 looms and dyeing and finishing machinery. The arrangement provides for the most economical handling of stock from the time bales are opened until the cloth is finally finished.

PRODUCING BLUE DENIMS

This plant is designed to manufacture colored cotton fabrics, and is now manufacturing indigo blue denims, which will be sold direct by the firm to the trade throughout the country, for the concern has proved successful in merchandizing its products as well as in manufacturing. The mill offices are located at West Peterboro, N. H., and at Winchendon Springs, Mass.

The members of the firm are Nelson D. White and Joseph N. White, Jr. These young men are the fourth generation of the White family in the cotton manufacturing business, the original plant having been constructed and operated by Joseph White, of West Boylston, Mass., in 1814. With this new unit added to their productive capacity the White mills become an even more important factor in the denim industry of the country.

Cleveland Worsted Mills Co.

NOTEWORTHY additions have been made to the Cleveland Worsted Mills Co. by purchase of the Fern Rock Mills and Biswanger property at Philadelphia, and the building of enlargements at the main plant in Cleveland, at Ravenna, Ohio, and at Jamestown, N. Y. A further improvement was the taking out of all old machinery at the Ferncliff Worsted Mills, at Falconer, N. Y., and re-equipping throughout with entirely new worsted machinery which increases the capacity about 40 per cent. These developments were undertaken largely as the result of the favorable conditions as regards cost in order to be prepared for further growth. It was felt that the work could never be done for less cost than under the conditions obtaining in 1915.

RECREATION BUILDING AT CLEVELAND

A 6-story building has been erected at Cleveland, 145 by 61 feet, which is open to the employes day and evening for recreative pursuits. It has steel framework with outer walls of brick and metal window frames and sash. The floors are of mill construction, finished with maple. The building is provided with a large tower, in which is located the stairway, dressing rooms and elevator. Its front, which faces on Broadway, is finished with Bokhara brick, laid in Flemish bond, and is trimmed with sandstone trimmings; the side walls are of brick, laid up in black mortar. In the basement are located bowling alleys, shower baths, etc., and on the first floor is a library, meeting room, billiard rooms, etc. Second and third floors are used as dining rooms. This building constitutes a notable addition to the welfare work of the industry.

JAMESTOWN DYEHOUSE ENLARGED

The increase in the works at Jamestown, N. Y., known locally as the Odsonia Mills, more than doubles the capacity of the dyehouse, making it possible normally to color 10,000 pounds of wool or yarn daily on the regular schedule.

NATIONAL ELEVATING ROLLER BEARING TRUCKS CHAPMAN

Let Your Truckers *Haul* — Not *Handle* — and Save Money!

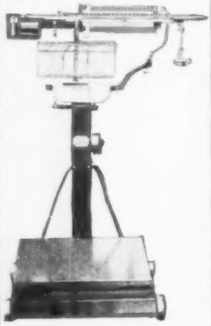
With old fashioned trucks most of the Trucker's time must be spent in loading and unloading.

Not so when you truck in the National-Chapman way. Goods are placed on and kept on skids and quickly transported about the mill with an absolute minimum of re-handling. 80% in time is saved and one man can do three or four men's work.

This saves money—it also prevents damage to material.

The National - Chapman turns in its own length in narrow aisles and handles heaviest loads safely and easily. It is built for long life and hard usage.

NATIONAL
Counting and Weighing Machine



A little material placed in the wire basket, when balanced on the beam, gives you correct count of yards or dozens in any bulk quantity of same material placed on the platform. Send for complete information.

The National-Chapman Elevating Truck saves money in other ways that it will pay you to know about. Send for complete information and ask for Illustrated Catalogue No. 14, which shows many trucks suitable for the textile industry.

NATIONAL SCALE COMPANY
42 Montgomery Street
CHICOPEE FALLS, MASS.
Manufactured in Canada by
National Scale Company, Brantford, Ontario

1—Wheels are equipped with Hyatt Roller Bearings, insuring permanent ease of haulage under heavy loads.
2—Heat-treated axles.
3—Powerful hydraulic PULL check. Is always in service. Lowers heaviest loads without a jar.
4—Safety handle release for lowering. This is in addition to the regular foot lever.
5—Foot lever release for lowering truck.
6—Construction of head enables front wheels to turn in a complete circle. Truck will turn in its own length in narrow aisles.
7—Sturdy lifting bars which, when truck is elevated, support and carry the loaded platforms.

Rid Your Dyehouse of Vapor

Eliminate Roof Condensation and Rotting

It is false economy to operate your dyehouse without an efficient system for the removal of steam, fog and vapor. Without such a system condensation cannot be eliminated and it is only a question of time before the roof will rot out and need replacing. This will cost much more than a complete Sturtevant System.

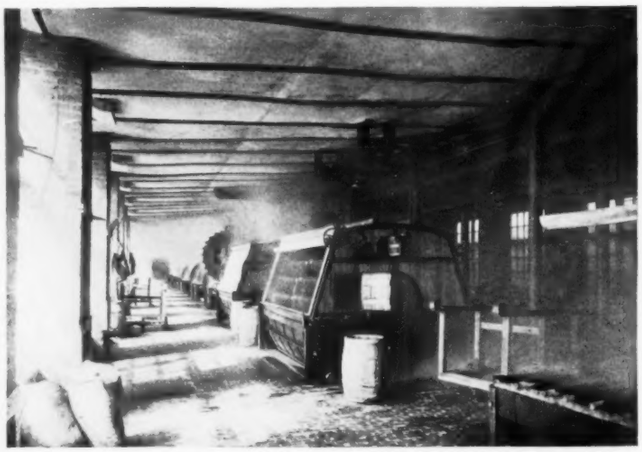
Sturtevant
REG. U. S. PAT. OFF.

Steam Absorption and Vapor Removal Systems

can be designed for any mill. They will not only remove vapor but will in addition constitute a heating and ventilating system. They will keep the atmosphere dry and warm in winter and dry and cool in summer and will promote good work and maximum efficiency.

Send us full details of your conditions and we will make recommendations without obligation to you — or would you like our engineer to call?

B. F. STURTEVANT COMPANY
HYDE PARK, BOSTON : : MASSACHUSETTS
And All Principal Cities of the World



This photograph was taken inside a dyehouse equipped with a Sturtevant System and has not been retouched in any way. This is an indication of the clearness of the atmosphere.

The addition is 236 by 60 feet, one story high and is equipped for both raw stock and yarn dyeing. Systems have been provided throughout to remove steam from the atmosphere, making the working conditions as comfortable as possible for the employes and ensuring superior results. During the previous year a 2-story brick building was erected at the Odsonia plant to provide additional storage room and for warping and spooling departments, which with this latest addition makes the Jamestown Mill an important factor in the Cleveland chain of plants.

INCREASES AT RAVENNA

The new building at the Annevar Dyeing and Finishing Mills of the Cleveland Worsted Mills Co., at Ravenna, O., will be used exclusively for dyeing and finishing and just about doubles the capacity, permitting them to comfortably dye and finish 45,000 to 50,000 yards of cloth daily when the entire building is in full operation. Operations were started in the new space the first week in January. Stairways are all of steel and are located in fireproof shafts on the outside of the building. Commodious toilet and rest rooms for the female help have been provided. A high-speed electric freight elevator, located in a fireproof shaft outside the building, has also been installed. The mill is equipped with an automatic sprinkler system and with a vacuum system of steam heating.

PHILADELPHIA MILLS PURCHASED

The opportunity to purchase the Fern Rock Woolen Mills and the Biswanger property at Philadelphia under favorable conditions was taken advantage of and these plants are now manufacturing the reliable Cleveland line of goods. The Fern Rock Mill has been extensively overhauled and considerable new equipment added, and is now in full operation under the name of the Fern Rock Woolen Mill Co. Branch of the Cleveland Worsted Mills Co., making fine worsteds. The Biswanger property is now known as Rowland Worsted Mills No. 2.

All new construction work was from the plans of George S. Rider & Co., engineers, of Cleveland, who carried out the ideas of General Manager George H. Hodgson for the systematic development of the Cleveland Worsted Mill Co.'s business.

Fairfax Mill, Fairfax, Ala.

FURTHER increase of the manufacturing capacity of the West Point (Ga.) Mfg. Co. proved desirable during the year to supplement the production of the mills at Longdale and Shawmut, Ala., so the management decided to put up another plant at Fairfax, in Alabama. There an old farm is rapidly being transformed into a manufacturing community with a busy cotton mill and a model village for the mill workers and their families. J. E. Sirrine, mill architect and engineer, Greenville, S. C., is in charge of building the mill and P. J. Berckmans Co., Inc., landscape architects of Augusta, Ga., are laying out the mill village with attractive houses and public buildings, providing an environment of comfort and recreation. The Gallivan Building Co., of Greenville, S. C., are the contractors.

MAIN MILL BUILDINGS

The main mill building is 3 stories high, 428 by 132 feet, with one story weave shed, 324 by 132 feet. The basement extends the entire length of the mill and the part of the basement under the weave shed will be used for machine shop and storage. Slow-burning mill construction has been used throughout and there is a monitor on the main mill and weave room sections. The Cramer system of humidity will be used with electric driven heads and regulators. Lighting will be done with 60 watt Mazda lamps in intensive type metal reflectors. The fire protection will be installed by the General Fire Extinguisher Co. and the heating system will be furnished by the Warren Webster Co.

OTHER BUILDINGS

Other buildings consist of warehouse compartments, boiler plant, transformer house and filter house. The boiler house consists of a building 32 by 35 feet, with adjoining pump room 23 by 22 feet. In the boiler room will be placed three vertical Manning boilers, 150 h.p. each, 1 steam fire pump, 1 electric fire pump and 1 centrifugal pump for water supply. The filter plant will provide drinking water supply to this and other mills of the West Point Manufacturing Co. A 100,000 gallon fire protection tank and 20,000 gallon domestic service tank are installed on a tower 110 feet high.

The mill will be driven by electric motors, using 4-frame drive motors in spinning and twisting, individual motors on pickers and large group motors in other departments. All motors, transformers, etc., are furnished by Allis-Chalmers Mfg. Co., boilers and tanks by R. D. Cole Mfg. Co.

FAIRFAX MILL VILLAGE

While the plans for the mill buildings were in a preliminary state, the West Point Manufacturing Company, realizing from previous experience, that a village built after carefully considered plans is much more convenient and well-appearing than is one which grows in a haphazard manner, engaged the services of P. J. Berckmans Co., Inc., of Augusta, Ga., landscape architects, to work with them and with the mill architect, J. E. Sirrine.

As the site of the new mill was rather unpromising in topography, the study for the mill village plan was made more difficult. About one-half of the area was in an open field, which lay along the top of a ridge, the slopes of which are badly worn by erosion. The remainder is in wooded slopes, running out in fan shape from the end of this ridge. The soil is a very stiff clay.

The first step in the work of the landscape architects was the preparation of a topographic map. By the time this was completed, the plans for the mill buildings were in a semi-final condition, so that a study could be made for their best arrangement and location.

A preliminary study for the location of the mill buildings, business center and residential sections of the village was first prepared. In studying this, the landscape architects cooperated with the mill architect and the owners, to secure the most favorable situation, considering the arrangement of the buildings in relation to the general village plan. By studying the plan as a unit, and not developing the mill and the village as two separate problems, a plan in which all of the component parts of the layout are properly correlated was worked out. In many instances of mill and village construction, the mill is located arbitrarily, without regard to the village plan. The landscape architect is subsequently called in, but enters the field with such serious handicap that he is not able to work out a scheme which, in any sense, is ideal.

PROBLEM REQUIRED STUDY

The exact position for the main mill building, which is 752 feet long, was selected from both practical and aesthetic considerations. The fitting of such an abnormally long structure, with its subsidiary buildings, to the irregular topography, required very thorough study. The problem was finally solved by placing the building along the length of the ridge, mentioned above, with the minor structures behind it on the slope, and the railroad spur running down along the contour of the hill, from the main line.

Good exposure to the prevailing southwest summer breezes was secured by this orientation, which is almost due north and south, and, since this ridge is the highest land on the whole site, questions of drainage and of water distributions were simplified. From aesthetic considerations, the site is excellent, as the eminence makes the buildings the focal point of attention from the railway, from the main approach, from the county road, and from the residential sections of the village.

In making the street plan, the main endeavor was to secure direct access to the mill and village from the county road and railroad station, and to make the mill and business center the focal point of all residential streets. The main approach to the mill is from the direction of West Point, Georgia. The road, as it enters the property, passes a slight elevation, on which will be located the homes of the superintendent and clerical force; thence it runs along the front of the mill building, and at the further end swings around the slope of a knob-shaped hill.

SCHOOLS AND PUBLIC BUILDINGS

This circle is the business center of the village, and from it radiate the residential streets. Here will be located stores, postoffice, churches, school and kindergarten. The areas inside of this circle, and in front of the main mill building, have been reserved as public recreation grounds, as have other small plots on which the topography is unfavorable for residences. All of these will be improved by proper grading, by the laying out of walks, and by the planting of shade trees and shrubbery.

The streets which radiate from the business center all fall away in easy gradients, insuring good drainage. Subsidiary paths, through the center of certain blocks, have been provided, so that every point of the village will be readily accessible from the mill, even though there is no street in a direct line. The streets were planned to follow the natural contour as closely as possible, to reduce the cost of construction and maintenance, and at the same time add to the appearance. The most important of these are 60 feet wide; those of lesser importance being 50 and 40 feet, and a complete electric lighting system is being provided. Twelve-foot easements, along the rear of lots, provide means for alley ways and for the laying of service pipe. Lots were made to average 100 by 150 feet in area, but, owing to the irregular street plan, many of these are irregular in shape. This adds to the picturesque appearance of the village.

In addition to the general plan, a complete grading plan and profiles for streets, were prepared. These show all elevations for streets, and the grading to be carried out on abutting property. Plans for a complete drainage system, with details for the construction of curbs, gutters, drain inlets, manholes and pipe lines, were included also. A water supply system, distributing water for domestic purposes, to all residences, and for fire protection, to properly situated hydrants, was worked out in connection with fire insurance underwriter's plan for fire protection on the mill buildings.

TREES AND SHRUBBERY

When the construction of the village has been carried on sufficiently, a complete planting plan will be prepared and carried out. This will provide shade trees on all the streets and in the parks, and planting of ornamental shrubbery to a limited extent, around the mill, in parks, and around certain buildings in the village. The areas on which the residential sections of the village were located were largely wooded. In grading streets, and in the building of houses, these trees have been preserved as far as possible.

IMPROVED TYPE OF HOUSES

The residences which are being erected for operatives are, in convenience and appearance, with electric lights, an improvement on the type generally used in mill villages. Though the construction work is as yet in an incomplete state, the appearance of these houses on the winding streets of the village is beginning to take on a picturesque appearance, decidedly a pleasing contrast to the usual straight mill village street with its monotonous rows of very common-place dwellings.

By undertaking this whole work in a thoroughly systematic way, the owners of the new Fairfax Mill have avoided considerable work, expense and inconvenience that might have been incurred if they had not made a thorough study of the situation and obtained in the beginning a clear conception of the result to be attained. By carefully considering all practical questions, and combining with this a study of the aesthetic possibilities, they will attain results which should be much more satisfactory than those that would have developed without such a careful preliminary planning. The plan of procedure in this work is one to be commended and one that might be followed, with profit by others who are considering mill and village construction.

Ballard Knitting Co.'s New Plant

THE Ballard Knitting Co., Norristown, Pa., built an entire new plant during the year with an increased capacity of 50 per cent. The old plant was sold to the Wildman Mfg. Co., who require more space for their knitting machinery business.

In preparing the plans and specifications for the new building, Frank N. Kneas, consulting engineer, Philadelphia, provided for the reduction of deterioration and depreciation to the lowest possible percentage, for the proper routing of all materials through the plant with adequate loading platforms, elevators, conveyors, etc., for ample daylight and for safety and minimum insurance risk. Windows and columns are spaced to allow the most elastic arrangement of machinery without losing space.

GENERAL DESCRIPTION

The mill proper is 102 feet long and 63 feet wide, and is five stories high, including the basement story. The basement story starts 2 feet below grade in front and is 3 feet 6 inches above grade in the rear, the ground sloping to the rear. The height of the basement was carefully studied so that the floor would be on a level with the loading platform at the rear, which is just wagon-bed height above grade, allowing trucking directly from the basement floor into the wagons.

The story heights are 11 feet 6 inches clear in first or basement story, and 12 feet 9 inches for the other stories, this being considered best from the standpoint of economy per square foot of floor and safety to employes. A freight

DELIVING DECEMBER SNOW AT STANDARD BLEACHERY CARLETON HILL, N. J.

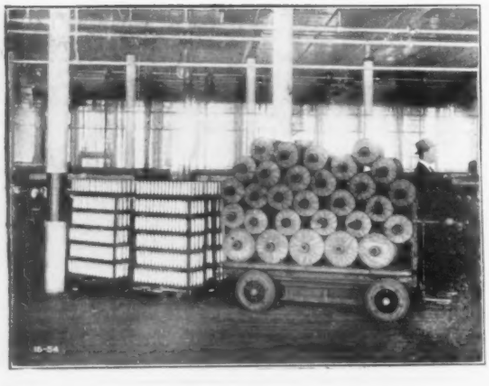
The HUNT Electric is an All-Year Truck

Indoors or outdoors — whatever the weather — the Hunt Truck can be counted upon to give the kind of service required by textile manufacturers. It is backed by our guarantee to make good.

Sturdy on the grade—sturdy on the level.

Steers around posts and into remote corners, keeping every part of your plant in touch with every other part.

Write for catalog A-14-1 and be convinced



HUNT TRUCK WITH TRAILERS IN USE AT NONQUIT SPINNING CO., NEW BEDFORD, MASS.

C. W. HUNT CO., Inc.

West New Brighton, New York, U. S. A.

61 Broadway, N. Y. Fisher Bldg., Chicago Munsey Bldg., Washington

A Hub or outside driving plate.
B Shell with extension sleeve.
C Sliding collar with racks and stop rod.
D Back plate, or inside driving plate.
E Thrust collar.
H Driving ring with friction inserts.
H-3 Driving ring screw.
J Spiral gear and screw.
K Spiral spring for separating driving plates.
L Ball thrust bearing.
M Hardened washer for thrust bearing.

No Toggle Joints Here

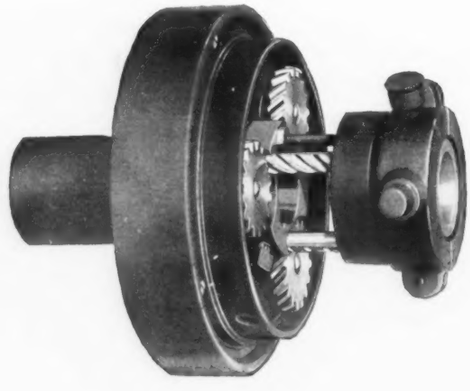
No meaningless parts of any kind. Examine this clutch, note its simplicity and see how these few simple parts comprise the

HILLIARD FRICTION CLUTCH

The illustration below shows operation of our patented Rack and Gear Spiral Thread Combination which admits of easy engagement, grips like a vise and seldom needs adjustment, mak- the HILLIARD

Supreme for Textile Mill Service

Let us tell you about our remarkable free trial offer



The Hilliard Clutch & Machinery Co.

Elmira, N. Y.

levator 6 feet by 6 feet, capacity 1½ ns, of the Craig Ridgway & Son Co. pe, serves all stories.

An outside fire escape is built against lank wall at the rear end of the ilding. There are no windows under- eath any story to emit flames and noke in case of fire to threaten those sing it. A stair tower, separated from the main building by a brick wall and n-clad fire doors, provides means of gress at the other end of the build- ng. This stair tower is also the main service stairway, and is built of heavy plank, making practically slow burning

BALLARD KNITTING CO.'S NEW PLANT, NORRISTOWN, PA.

construction, even in the stairway, though it is separated from the main building. The walls of the stair tower are built of sufficient strength to re- ceive a 12,500 gallon sprinkler tank.

SLOW BURNING CONSTRUCTION

The construction of the factory throughout is of slow burning type, with sprinklers throughout, including the stair tower. There are two rows of posts on 9-foot centers, making the panels 9 feet by 20 inches. The plank is 3 inches thick of N. C. yellow pine, covered with No. 2 maple flooring. The girders are 12 by 16 inches for second floor and 12 by 14 inches for upper floors, and the posts vary from 14 by 14 inches to 8 by 8 inches, all of L. L. yel- low pine. The ground floor is cement on cinder concrete laid on a bed of cin- ders, rolled and tamped. The design of the bases for the posts is worthy of note, in that there are no projections to interfere with trucks, the bases prac- tically being concealed under the shafts of the posts.

The splendid window arrangement, giving ample lighting for the whole 60- foot width of building, is a valuable feature and recognizes the increased speed and accuracy in working under good conditions.

There are no curtain walls between piers, except above and below the win- dows. The inside wall surfaces are painted with a slate colored dado to a height of four feet and above that are coated with Rice's mill white. The Lupton windows are glazed with fac- tory ribbed glass, ribs vertical to pre- vent undue glare and to prevent hard- ship on the eyes of the workers. All windows have ventilating sections, those in the stair tower being specially ar- ranged to admit firemen in case of fire.

The walls are dry, even in the base- ment. The foundations of concrete were painted with waterproof paint be- fore the brick-work was started, to pre- vent water being drawn up into the walls by capillary action. Walls not so treated are likely to absorb moisture from the foundations, the same as a lamp wick draws up oil. Over each window at the end of each room on each story, a tie rod with washers was embedded in the brick work to take up the arch thrusts, and to give added stability to the walls, with practically no additional expense. The walls in the lower portion of the first story were laid in cement mortar and above in a combination of lime and cement mortar.

Air spaces were left around the ends of all girders, bearing on cast iron wall plates, resting on the walls, to prevent any possibility of dry rot. All timber was carefully inspected before being placed in the building. Cast iron post caps were used throughout. The plant, office and rest room are equipped with sprinkler system throughout.

OFFICE AND REST ROOM

The office and rest room are at the right of the main stair-tower at the front of the building. The rest room, containing piano, easy chairs, lunch table and kitchen, is on the level with grade at the front of the building, and as its story height is less than that of the factory proper, the office floor above comes on a level with the second floor of the factory. The entrance is large and wide and the office with its 12 foot story height, and its light and air on three sides, is most attractive and well adapted to efficient work.

The power house is at the rear and contains 125 H.P. boilers and 100 H.P. Ames Iron Works engines to supply light, heat and power to the building.

Each sub-contract was let directly by the owner under specifications and con- tracts prepared by the engineer, F. N. Kneas, of Philadelphia. N. D. Wright, secretary and treasurer of the company, is thoroughly familiar with building construction and personally attended to the letting of all contracts, and superin- tended the work.

The Ballard Knitting Company's lines comprise men's, boy's and children's jerseys, jackets, bathing suits and ath- letic shirts; children's and misses' sum- mer underwear, and web anklets and knitted fabrics, which are sold direct and through Hecht & Campe, Inc., 377 Broadway, N. Y.

Wm. Barnet & Son Rebuild

ONE of the finest types of modern shoddy mill construction is the new plant of William Barnet & Son, Rensse- laer, N. Y., built to replace the old plant destroyed by fire. Every precaution was taken to make the new mill as fireproof as possible, and modern appliances have been provided for the comfort and safety of employes which remove many of the obnoxious conditions characteristic of shoddy manufacturing. The old mill was completely destroyed in February. Plans for the new mill were completed in May and construction contract was awarded to Morris Kantrowitz, of Albany, calling for the completion of the building, ready for machinery, in three months. Manu- facturing was resumed in December. Land adjacent to the mill has been pur- chased and in the Spring lawns will be laid out and other improvements will be undertaken.

NEW MILL OF CONCRETE

The new plant is of reinforced con- crete with concrete piers from plans by C. R. Makepeace & Co., of Providence, R. I. It measures 342 feet long by 60 feet wide, three stories high, not includ- ing the stair tower. The office building is a one-story structure built of brick with concrete floors and is connected to the mill by a passageway. Two electric elevators have been installed with cars 8 by 8 feet. The shipping platform is of concrete and extends the entire length of the mill and storehouse, which with a railroad siding with capacity of load- ing and unloading ten cars at the plat- form gives excellent shipping facilities. An industrial railway track has been in- stalled for coal, and two large scales for shipping and receiving have been put in both the mill and the storehouse. The gauze houses are built of Hyrib and cement and all partitions are of the same construction. The oil house is in a separate compartment and the build- ing for storing chemicals is separate from the mill. Two inclosed steel run- ways connect the mill with the store- house.

POWER PLANT, ETC.

Power is developed by a 750-h.p. twin engine direct-connected to a 625-k. v. a. generator. Provision has been made for a breakdown service from the local power company to insure uninterrupted operation. The pickers will be driven by individual motors and group drives will be used for the rest of the equipment, except in a few instances. In all 28 motors, all of the latest General Electric type, have been installed. The mill and storehouse are lighted by electricity and steam heated, regulated by thermostatic control. The heating plan is laid out to utilize exhaust steam. Pumps are oper- ated by electric power.

EQUIPMENT ALL NEW

Every machine is new and of the latest type, and the arrangement is so laid out that the highest attainment of efficiency and production is secured, greatly increasing the production ob- tained before the fire. The first floor is used for carbonizing and engine-room, with partitions between. The second floor is used for picker room, equipped with Dodge and Saco-Lowell pickers, batch rooms, drying rooms, sorting room and baling presses. Shower baths have been installed in the sorting room. The third floor is used for carding and for baling carded stock. In building and equipping the new plant everything pos- sible was done to make an ideal shoddy mill, and the owners state that they feel confident that, all things considering, they have the most modern plant in the world devoted exclusively to making shoddies.

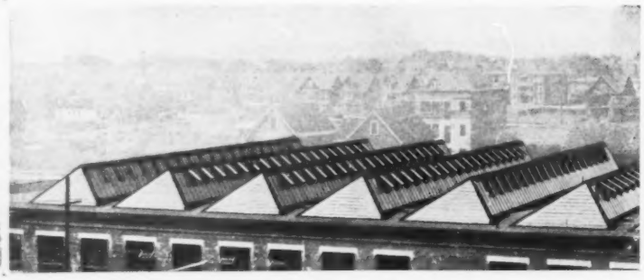
Plymouth Mills Enlargement

A LARGE new building which marks the beginning of a development to replace the older buildings of the Plym- outh Mills, manufacturers of rugs and mattings, with more modern structures especially designed and constructed to meet the requirements of their business, is being erected. This new building is now partially completed and when oc- cupied will provide for an increase in all departments and give better working conditions for the operatives.

UNUSUAL SYSTEM OF ROUTING

The building is 157 feet long by 77 feet wide, 6 stories high, with elevator and shipping facilities, and is designed for future extension. The general grade of the mill yard is such that the third story of the building is designed to come opposite the shipping platform

ADDITION TO PLYMOUTH MILLS, LAWRENCE, MASS.



Your Weaving Shed

Needs Fresh Air and Sunlight—*Both*

Looms in the middle of your floor cannot be lighted by side windows. Artificial light throws black shadows, causing imperfections in fabrics and falling off in production. Windows opened and closed at random cause draughts and discomfort. Sash opening devices that jam or rust are ignored by the workmen—result, no ventilation at all.

Drouvé Sawtooth Roof Solves *Both* Problems

It furnishes an evenly distributed natural light, and it has the added feature of providing uniform, easily regulated ventilation, putting vigor into your workers and keeping them in good health and spirits.

But what makes this sawtooth roof practicable is the sterling construction of the two Drouvé products that are combined in this special design, as follows—

"ANTI-PLUVIUS" (Trade Mark)
Puttyless Skylights

Ribs of high carbon rolled steel throughout. Glass is bedded between pads of non-rotting cow hair felt—no putty to crack—no leaks. Waterproof—fireproof—expansion and contraction taken care of—no condensation drip. Plain, wired or ribbed glass can be used.

"STRAIGHT-PUSH" Sash Operators
PATENTED

Working on the push-and-pull principle, these operators cannot bind, clog, jam or catch. Sash can be locked at any point and instantly closed in case of fire or wind. One man can *easily* open or close 150 or 200 ft. of sash. These operators are "built to stand the kind of use they get."

Let us give you working information on skylights and sash operators, illustrated with photographs and drawings with clear details. Our experts have made a study of daylighting and natural ventilation, and it is all in their day's work to answer your questions.

The G. Drouvé Co.

Bridgeport, Conn.

(180 N. Dearborn St., Chicago, Ill.)

An Installation of Durand Steel Racks

DURAND Steel Racks are the product of long experience and perfect manufacturing facilities. Will stand up under heavy loads and the roughest usage. No waste space. Will increase storage capacity 25 per cent. Absolutely fire-proof. Readily moved or added to. Will reduce to minimum, time required to handle stock, and prevent waste, depreciation and losses.

DURAND Steel Lockers are the high standard in steel locker equipment. Absolutely fire-proof, clean, and easy to keep clean. Practically indestructible. Sanitary, vermin-proof. Constructed entirely of steel and equipped with Yale locks, insuring absolute security. An installation is a credit to the modern shop or factory.

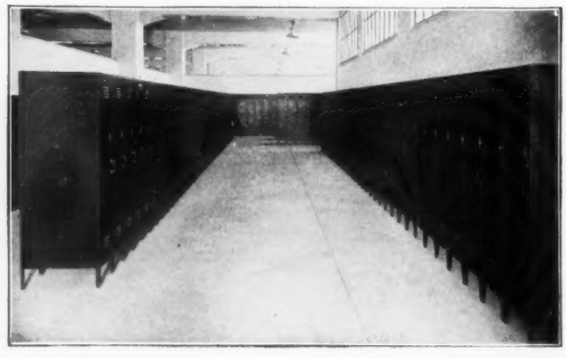
We will gladly prepare plans, specifications and estimates on Steel Locker or Steel Rack Equipments

DURAND STEEL LOCKER CO.

981 Vanderbilt Bldg. NEW YORK

1581 Ft. Dearborn Bk. Bldg. CHICAGO

An Installation of Durand Steel Lockers



adjacent to the side track. This allows a rather unusual system of routing materials, in that they are received and delivered at about one-half the height of the building. It allows material to traverse a minimum distance during the course of manufacture. The building has brick pilasters, steel beams, plank floors with hardwood tops, Milford filled columns, occupying a minimum amount of space, and steel sashes. The roof is the regular tar and gravel roof. This type of construction is rigid and stiff and will allow the operation of machinery with little vibration. It also provides ample daylight.

PLENTY OF LIGHT AND AIR

The mill will be equipped with a sprinkler system and is arranged with toilet rooms and cloak rooms at one end of the building, where there is plenty of light and air. The fire-escape is in an inclosed tower with no opening into the mill proper, the entrance being from balconies outside of the mill, in accordance with Philadelphia laws. Electric power will be used from the hydro-electric power plant, put in a few years ago under the supervision of Messrs. H. M. Haven and Wm. W. Crosby, the architect-engineers of the present new mill. Group drives will be largely used and probably some individual motors will be installed on a few of the machines. Details of new machinery equipment have not been fully decided.

The Plymouth Mills manufacture carpets, rugs, art squares and fiber rugs. The present equipment consists of 2,000 twister spindles and 128 wide looms. I. D. Einstein is the president, I. Solomon, treasurer and H. A. S. Read, agent and buyer. The product is sold direct through the New York office.

New Silk Mill for the Kattermann & Mitchell Co.

A NEW reinforced concrete silk mill has been constructed for the Kattermann & Mitchell Co., manufacturers of broad silks, with plants at Port Jervis, N. Y., and Paterson, N. J. The new building takes the place of the old Port Jervis mill. It is of the most modern type of construction and arrangement throughout and particular attention has been paid to light, facilities for handling material and to provide the best working conditions for the employes.

The building measures 54 feet by 250 feet, two stories and basement, column spacing being 27 feet by 20 feet which gives plenty of space for placing machinery without column interference.

LARGE WINDOW AREA

Sixty-seven per cent. of the exterior wall surface is window area with modern steel sash and ribbed glass, thus giving about 100 per cent. more material light than is usual in factories constructed for the manufacture of silk products.

All floors are reinforced concrete with a double wood finish, which admits of fastening machinery to the floor in any spot. All stairways are fireproof, inclosed in fireproof walls protected by Underwriters fireproof doors. The plumbing and heating is of the latest design.

MACHINERY EQUIPMENT

On the completion of the new mill the machinery was moved from the old Port Jervis plant to the new space and new machinery was added in all departments, bringing the capacity up to 225 latest type Crompton & Knowles, Eastwood and Stafford plain and box looms, with accompanying warpers, quillers and winders of the newest design. The machinery is run by electric power and the building is lighted by electricity. At the present time lines of crepe de chines, georgettes, taffetas and messalines are manufactured under the management of James A. Wiley, who is superintendent.

NEW SILK MILL OF KATTERMANN & MITCHELL CO., PORT JERVIS, N. Y.

The better working efficiency of the help due to better working conditions, which a modern fireproof daylight factory gives, has been a source of gratification to the owners. The building was constructed by the B. & W. Concrete Co., Newark and Paterson, N. J., Doremus Bensen, president.

Hogansville Manufacturing Co's Additions

BUILDINGS which will double the capacity of the Hogansville Manufacturing Co., besides providing manufacturing economies are just being completed, and improvements are under way at the mill village including the construction of new tenement houses for employes, as a result of the heavy demand for cotton duck.

GENERAL DESCRIPTION

The mill enlargements, for which plans and specifications were prepared by Lockwood, Greene & Co., of Boston and Atlanta, comprise a manufacturing building on one end of the old plant, a storehouse on the other end, and a waste house. The changes included the removal of the machine shop and an old storehouse. In deciding upon plans for this development it was considered advisable to carry out the general style of the older structures and the lines of the new buildings, windows and all details are a duplicate of the present plant. Construction work is being done by the Fiske-Carter Construction Co., of Worcester and Greenville, who received the contract in September.

DETAILS OF BUILDINGS

The new manufacuring building is a two-story structure, 271 feet long and 105 feet wide, to be equipped for making heavy duck. It is of slow burning mill construction with extra timbers in floors to reduce vibration. Looms of extra heavy design will be set up on the first floor. The yarn department will be on the second floor. The storehouse consists of a four-story building in two sections with fire wall in the center and measures 105 by 100 feet. It is of slow burning construction and has a capacity of 4,200 bales. In the basement is located the opening department from which cotton is blown to the picker room. Adjoining the storehouse is a two-story waste house, 42 by 42 feet.

EQUIPMENT

New machinery will be installed including 5,000 spindles and 50 looms, which will double the output in all departments. The looms will be driven by individual motors and small group drives will be used in the yarn mill. Electric power will be purchased. The present equipment is 5,184 ring spindles and 54 looms. The Hogansville Manufacturing Co. is controlled by the Internation Cotton Mills of 60 Federal St., Boston, manufacturers of bags, cotton duck, sheetings, osnaburgs, tire fabrics and yarns. Other mills operated are the Stark Mills, Manchester, N. H.; La Grange Mills, La Grange, Ga.; Imperial Cotton Co., Hamilton, Ontario; and the Cosmos Cotton Co., Yarmouth, Nova Scotia.

DUPLAN SILK CO. EXPANSION

Two large new mills will shortly be added to the capacity of the Duplan Silk Co. One addition is in the form of a 300-loom weaving mill at the main plant in Hazleton, Pa., and the other is a 40,000-spindle throwing plant, including a large steam and electric power house, at Dorrancetown, near Wilkes-Barre, Pa.

The new weaving mill is one-story and basement, brick, concrete and steel, with saw-tooth roof, 90x180 feet.

NEW THROWING MILL

The silk throwing mill is 2-stories and basement, 420 by 161 feet with brick walls, and first floor of concrete. The roof is of saw-tooth skylight construction with tarred felt and slag roof covering. The main floor of the building consists of two large spinning sheds, with a central building which is used for offices and shipping purposes. The steel sash installed in the skylight is 6 by 75 feet; it is double glazed and provided with gutters for condensation to prevent dropping on the floor beneath.

Systems of air washing, heating, cooling and humidifying, also electrical system for light and power, fire protection and sprinkler apparatus are being installed. The equipment of the present unit will comprise 40,000 spindles and it is expected manufacturing will be started in February.

The steam and electric power-house is of brick and concrete construction, 87 by 74 feet, and is located directly across the street from the new plant. It is equipped with two 400-h.p. water tube boilers, with provision for a future additional boiler of the same size; two 400-K.V.A. generators direct-connected with 150 r.p.m. engines, with provision for a 400-K.V.A. generator to be installed in the future for alternating current. Ballinger & Perrot, of Philadelphia and New York, are the architects and engineers. The United Fireproofing Co., New York, are the contractors.

The Duplan Silk Co. are among the largest manufacturers of piece-dyed broad silk and silk mixed goods in the United States, with plants at Hazleton and Dorrancetown, Pa., and West New York, N. J. J. L. Duplan is president, A. R. Salembier, treasurer, and E. Buhler, buyer.

LARGE ADDITION TO SHODDY MILL

The demand for wool shoddies and extracts during the year is reflected in the new mills built and extensive enlargement made by many concerns in this line. One of the most important enlargements was made by John T. Slack Corporation, manufacturers of wool shoddies, extracts and flocks, at Springfield, Vt., who have completed a new 2-story addition and added a number of new cards and pickers, largely increasing the production. Construction was started in the Spring and completed August 1. The new mill is of brick and cement construction, 350 by 55 feet, especially designed for the manufacture of their lines as regards handling material, arrangement of machinery, light and other factors entering into production costs. Space is largely used for the picker department and assorting department, and a rearrangement has been made, and new machinery installed, bringing the equipment up to 49 sets of cards and 42 pickers. The concern is having a heavy business. William H. H. Slack is president, Albert C. Bowman, vice-president, and John T. Slack, treasurer.

FORSTMANN & HUFFMANN CO. ADDITIONS

Among the most important of all enlargements of the year in the woolen and worsted industries are the three new buildings that have been completed or are in the course of construction at Passaic and Garfield, N. J., for Forstmann & Huffmann Co. One of the new buildings being erected at Garfield will be four stories high, 64 by 198 feet, of regular mill construction, and will provide for an increase in the woolen yarn department. The latest enlargement, for which contract was awarded in September, will be five stories high, 54 by 280 feet, and will be used for offices, shipping and warehouse purposes. The interior construction will be of reinforced concrete, with brick and limestone walls and architectural terra-cotta front.

Forstmann & Huffmann Co., are one of the largest factors in the manufacture of fine woolens and worsteds for men's and women's wear, fine broadcloths, novelties and dry-spun worsted yarns on the French system.

HILLSIDE COTTON MILLS

An important new cotton mill has been established at La Grange, Ga., under the name of the Hillside Cotton Mills by men connected with the successful Elm City Cotton Mills, Unity Cotton Mills, Unity Spinning Mill of La Grange and the Manchester Cotton Mills at Manchester, Ga. At first 8s to 24s special cotton yarns will be manufactured, also lines of twines and kindred specialties. Park A. Dallis Co., Atlanta, prepared plans and specifications for a three-story main building, 315 by 132 feet, with boiler and engine room connecting, a number of one-story warehouses, 81 by 76 feet, a one-story office building, 50 by 30 feet, and 125 four-room houses for operatives. T. C. Thompson & Bros., Birmingham and Charlotte, general contractors and builders, were awarded the construction contract. The initial equipment includes 21,000 spindles with preparatory machinery, and it is understood several hundred looms may be installed at a later date. The Hillside Cotton Mills have been incorporated with capital stock of $500,000. C. V. Truitt is president: S. Y. Austin, vice-president and general manager: Fuller E. Callaway, treasurer; J. A. Perry, secretary. J. H. Lane & Co., New York, have been appointed selling agents.

UNDER FIRE

BUYER SALESMAN

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A goodly number of the large and prosperous textile mills in this country. Want names? We will gladly furnish them.

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Cooper Hewitt *Light* costs nothing, because it pays for itself over and over again in the increased quantity and quality of output. Cooper Hewitt *Lamps* are therefore not an expense, but a dividend paying investment. They run with little expense for upkeep other than an occasional cleaning.

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Daylight meets your conditions all right, doesn't it? Well, Cooper Hewitt Light is the full equivalent of the *best* daylight; it can be adapted perfectly to your special case. Very likely you have conditions that Cooper Hewitt Light will serve *better* than daylight.

"We Have Always Made Money with Our Present Lighting; Why Should We Change?"

So that you can make *more* money! If you cut your labor costs by using Cooper Hewitt Light,—*and you can*,—then you can't *afford* to cling to your old lamps. Things have changed a lot since you put in your present lighting system.

And here is our parting shot: Use Cooper Hewitt Light because it is better than daylight. Our monograph on "Economics of Industrial Lighting" (Bulletin No. 762) is recognized as a standard on the subject. A copy will be sent on request.

Better Than Daylight

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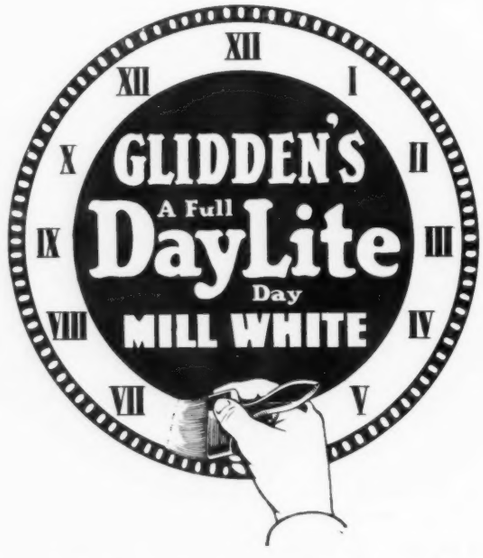
Boston Cleveland Detroit Philadelphia St. Louis
Chicago Cincinnati Pittsburgh



A Full DayLite Day

DayLite work is efficiency work. The longer the day the greater the production. No artificial light can ever equal old Sol.

Lengthen both ends of your business day with Glidden's DayLite Mill White—a mill-white paint that is durable, sanitary and water-proof. Not a whitewash, but a non-porous light reflector that will not chip, flake or turn yellow.

Glidden's DayLite Mill White is made in Gloss, Semi-Gloss, and Flat. It sets dust-free in 4 to 5 hours—dries for recoating in 36 to 48 hours and covers from 400 to 500 square feet to the gallon, varying according to application and surface conditions. Much more can be said about this Glidden product if you will give us an opportunity. Put in a call for the Glidden Man.

The Glidden Varnish Company

Manufacturers of Glidden Quality Varnish and Paint Products for every industrial use. A complete line of finishes for your factory and for your product.

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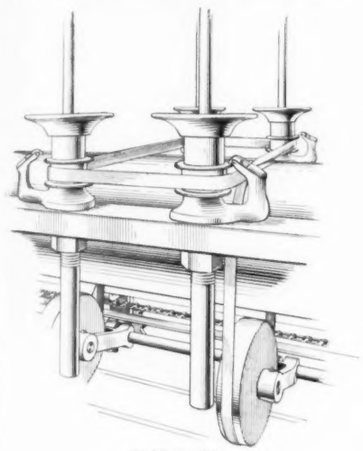
New Machinery and Processes

UPRIGHT BOBBIN SPOOLER

An upright bobbin spooler, designed and constructed with a view to smooth running and ease in operation and adjustment, has been brought out by the Easton & Burnham Machine Co., Pawtucket, R. I. Distinctive features are the tape drive, a quick traverse changer and a bobbin conveyor.

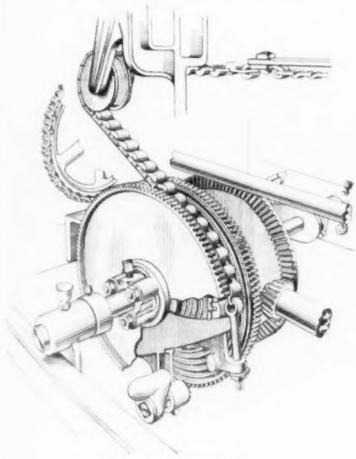
The tape drive is now being generally adopted for spinning frames, but applying it to spoolers is a new depar-



TAPE DRIVE

ture. The advantages to be derived from a tape drive can readily be seen, an even tension on the spindles and consequent even speed, but its chief recommendation is its durability. It is claimed that one set of tapes will last at least one year.

The advantages of a quick method of changing the traverse are evident. The patented device for this purpose is such that the traverse of a side can be changed



TRAVERSE CHANGER

three inches in from one to three minutes without stopping the machine. It is especially desirable in yarn mills where it is necessary to frequently change the length of traverse.

Conveyors for bobbins are not new but are now recognized as desirable. The conveyor is placed on each side of the spooler and delivers in boxes at the end of the machine. It is friction driven and gives no trouble.

A reel for winding direct from jack spools which has many distinguishing features has also been itntroduced. Compact arrangement of parts, saving floor space, high speed patent latch or swifts preventing collapsing, are notable accomplishments. A simple "Grant" traverse motion with which the machine is equipped is adjustable so that the width of skeins may be varied. A stop motion and measuring attachment that requires no attention from the operator is used and automatically stops the reel when the required number of yards are wound. Protection has been provided against oil. Doffing is simple and a high production can be obtained.

THE GORDON CARD ATTACHMENT

The Gordon-Hay Co., Utica, N. Y., has installed in a number of mills its Gordon double licker-in card attachment for producing better yarn from cheaper cotton. This invention was developed by a cotton mill superintendent to produce a cleaning machine which would primarily prepare cotton for the card so that the different functions of the card could do their work more effectively. The results obtained have proved of such value that two of the largest builders of cotton cards in this country have arranged to produce the new attachment for their own makes of cards and for the cards of other makers.

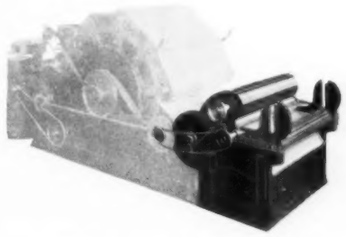
The practice of feeding to the licker-in a lap of cotton compressed by the calendar rolls of a picker requires that the licker-in act as an opener, which it does ineffectively. The result is that lumps of cotton are carried past the mote knives to the cylinder, and in order to remove trash and short fibers the mote knives necessarily take out a considerable amount of good cotton, and the cotton is delivered to the cylinder containing short fibers and trash which fill up the wires of the cylinder and flats. Obviously, if the cotton can be cleaned of trash and a majority of short fibers before it reaches the cylinder, the cylinder wires and flats will stay clean and sharp longer, allowing them to card the fibers more effectively, thus producing a stronger and more even yarn, as the unevenness caused by stripping is minimized by the lightness of the cylinder strips.

DESCRIPTION AND OPERATION

The lap of cotton is fed to a preparatory licker-in in the usual manner and carried past the mote knives to a revolving brush placed above the licker-in and set about 10-1000 of an inch from the latter. The brush, revolving in the same surface direction and at a greater speed than the licker-in, removes the lint from the latter. A draft of air through the condenser cage from a fan draws the lint from the surface of the brush to the surface of the condenser, which delivers to the feed-roll of the card a loose, fluffy sheet of cotton.

There is no draft of air from the cylinder on the preparatory licker-in, and a section of the licker-in screen is removed and replaced with extra mote knives. With this arrangement, seed, sand, leaf, etc., are removed by the mote knives without removing fibers and the resulting waste, even from the highest grades of cotton, resembles very dirty picker droppings.

The Gordon double licker-in card attachment can be applied to all makes of cards. It is made up of simple-moving

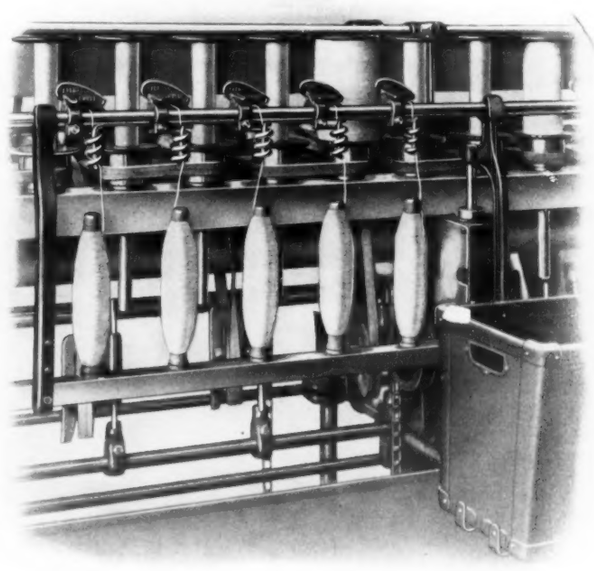


GORDON CARD ATTACHMENT

parts, which are easy to set up or take down, and which should minimize a grinder's work, as the attachment safeguards the danger of any foreign material getting to the cylinder and injuring the wires.

SPIRO-AUTOMATIC TENSION DEVICE

One of the important new products of the Saco-Lowell Shops, brought out during 1915, is a new spiral yarn tension device for use on winders and spoolers. It fills a long felt need. The device automatically threads itself up, and is actually automatically adjusting to a certain range of yarn, greater or less as the case may be, and determined by particular considerations.



SPIRAL YARN TENSION DEVICE

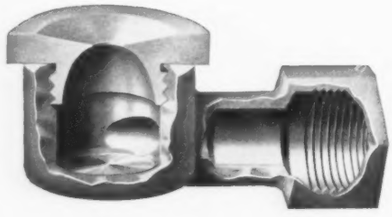
In a general way, the device consists of a set of coils like a spring, with the last turn of the wire bent inside the spring and running up through it. When at the top, this center-piece is bent at right angles in a way to meet the requirements. When this spring-like set of coils is placed in the path of the ballooning yarn, in such a manner as to allow the yarn to balloon freely and run in its proper path, the yarn throws itself around the center-piece of the device as many times as there are coils, and always in the same way, whenever the yarn is tied and dropped onto the thread guide rod long enough for it to catch and wind around.

The particular features of the device are: first, its simplicity, since it has little to it, and cannot get out of order; second, its automatic feature, it cannot be forgotten nor threaded up wrong, nor become inoperative from dirt; third, its automatic change in tension according to numbers of yarn and twist contained by it, soft twisted yarns giving less tension than hard twisted yarns, and coarse yarns giving more than finer yarns, within the range which the device will handle; fourth, its increase in the general efficiency of spoolers and their operatives, through use of higher spindle speeds, and less motions for threading up; fifth, its cheapness, being easily made and selling for a low price.

RIGHT AND LEFT HAND

This device may be made with both right and left-hand coils, in which case it will work automatically for either right or left-hand yarn, and may be used also as a reverse-twist detector on yarn where this is required, though these instances are rare. It is said to be preferable, however, to use it for a single-hand of twist, either right or left.

Where the simplicity of a device is of such valuable characteristics as in this case, and where dependability is held in higher esteem than any other consideration, this device meets a long-felt need, and it is probably not too much to expect that its influence will be great to expedite the progress of the filling wind for warp yarn from ring frames in this country, since it largely reduces the problem of spooling successfully from



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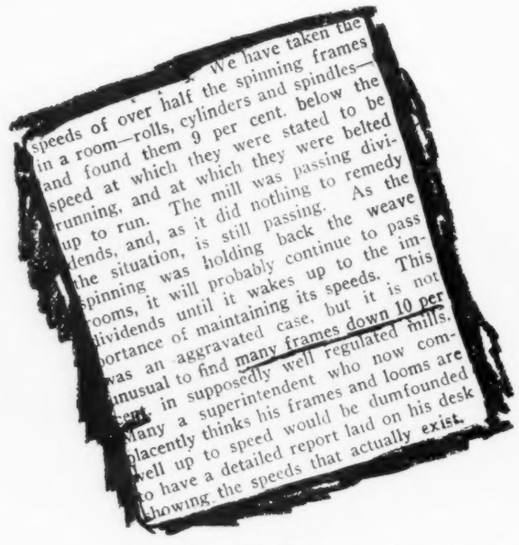
Buffalo Forge Company

Buffalo, N. Y.

Manufacturers of Forges, Blowers and Exhausters, Ventilating Fans, Air Washers, Pumps of all types

Do You Know Just How Fast Your Machines Are Running All the Time?

Here's the result of an investigation in a mill which was sure it was obtaining efficiency operation of its machines.

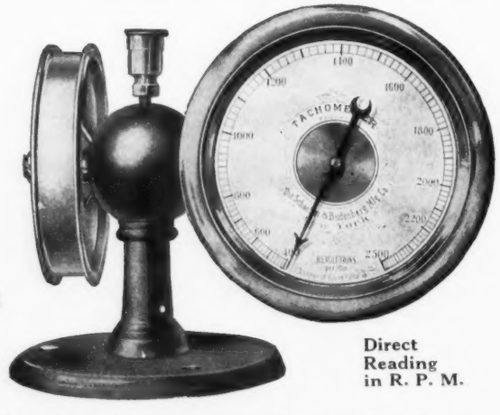


speeds of over half the spinning frames We have taken the in a room—rolls, cylinders and spindles— and found them 9 per cent. below the speed at which they were stated to be running, and at which they were belted up to run. The mill was passing dividends, and, as it did nothing to remedy the situation, is still passing. As the spinning was holding back the weave rooms, it will probably continue to pass dividends until it wakes up to the importance of maintaining its speeds. This was an aggravated case, but it is not unusual to find many frames down 10 per cent. in supposedly well regulated mills. Many a superintendent who now complacently thinks his frames and looms are well up to speed would be dumfounded to have a detailed report laid on his desk showing the speeds that actually exist.

From Textile Manufacturers Journal, April 10, 1915

Know **speeds at all times. Install**

S. & B. Tachometers



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A complete line of Indicating and Recording Stationary Tachometers for permanent installation, as well as Hand Tachometers for test use. Ask for pamphlet Tex—23.

We are also makers of "Crescent" Thermometers, "Columbia" Recording Thermometers. "S. & B." Gauges, "Columbia" Recording Gauges, Counters, etc. Also all instruments for the promotion of efficient and economical operation of the Power Plant. Catalog on request.

The Schaeffer & Budenberg Mfg. Co.

Berry and So. 5th Sts. Brooklyn, N. Y.

the filling wind in the winding department.

An improved willow or duster for cleaning soft cotton waste has also been introduced by the Saco-Lowell Shops. This machine is of very solid construction to withstand the shock of heavy intermittent feed and discharge of large masses of material. The capacity is 4,000 to 10,000 lbs. per day.

AN AGITATING TABLE DRYER

A new agitating table dryer has recently been brought out by the James Hunter Machine Co., North Adams, Mass. The apron or table for carrying the stock is a departure from the standard table in construction. It is made of No. 16 perforated sheet steel, flanged on the edges and reinforced on the ends with cold drawn steel channels. The plates are 12 inches wide and as long as the width of the table. The table is formed of a series of these plates set on an angle, every alternate one being stationary and the others movable. The movable plates by their motion back and forth carry the stock through the machine.

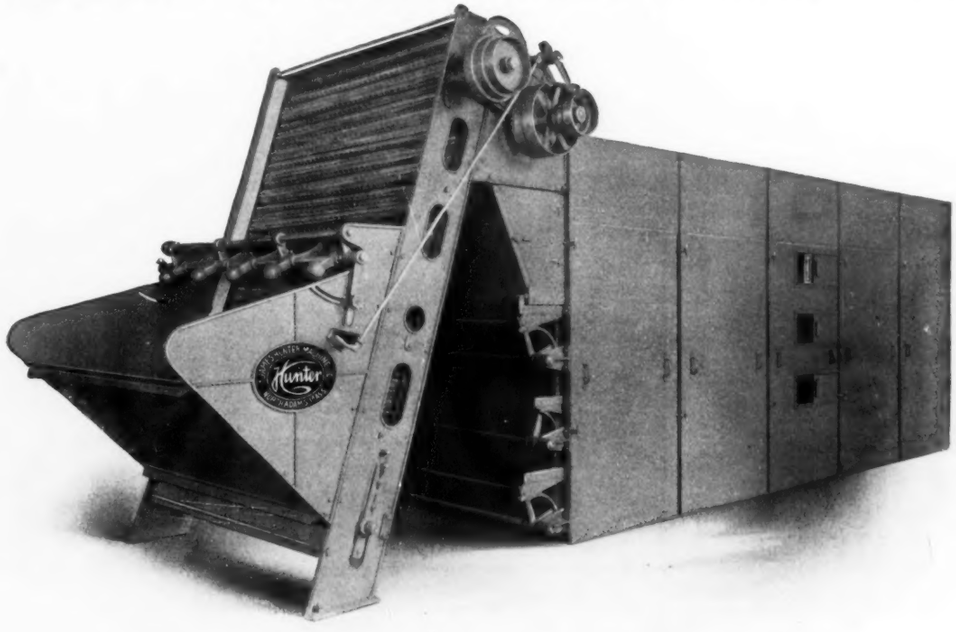
In the agitating table dryer cone fans circulate the air heated by unit steam coils and this heated air coming in contact with the material turns the water into vapor. The exhaust fan removes this vapor. The material conveyed by the table is in a constant state of agitation, subjecting every particle of stock to the same temperature and volume of air, giving even results and putting the stock in a lofty state for future operations.

OTHER FEATURES

The cone type of fan has been adapted as the best for dryer work. The air is taken in at the center and deflected by the cone-shaped hub to the blades with the least resistance. It is delivered at the periphery in a direction at right angles with the fan shaft. The fan shafts are mounted on S. K. F. ball-bearings of the retainer type, and it is estimated that they effect a saving in power of 30 per cent.

The heating coils are of the unit type and are located in separate compartments at the side of the dryer. Each unit contains the equivalent of 100 lineal feet of one-inch pipe, equal to 34.48 square feet of heating surface. It can be seen from this construction that a battery of any number of units can be assembled and just the desired amount of heating surface obtained. The design lends itself readily to an increase in heating surface or repairs. The dryer is equipped with an automatic feeder of special design and convenient adjustments. The apron of the feeder is made of hard maple slats mounted on link belting.

The length of each section is 3 feet 10 inches; height, 8 feet; width of dryer with 6-foot table, 9 feet 6 inches; length of feeder, 8 feet 4 inches. The builders claim that the new dryer has demonstrated that it requires less floor space, less power and less steam than any dryer of which they have knowledge.



JAMES HUNTER MACHINE CO'S AGITATING TABLE DRYER

To dry any material it is necessary, first, to heat the surface of the material, thus turning the water into vapor, and second, to remove the air containing the vapor. Evaporation is mainly from the surface of the material so that if provision is made to agitate the stock so that each particle comes repeatedly to the surface, evaporation will be more rapid. The new dryer meets these requirements.

PAPER TUBES FOR WINDING CLOTH

The Pairpoint Corporation, New Bedford, Mass., have perfected and are supplying large quantities of paper tubes to meet the growing demand for a roll cheaper than the usual wooden roll. They are making hard, substantial paper tubes of accurate size and proper finish which will take the material to the user without crushing or collapsing. Tubes are made of any diameter and length to suit the requirements and combine hardness, lightness and strength, as well as accurate size. They are so inexpensive that they need not be returned, so that the saving over wooden rolls is considerable. The variety of sizes range from 15 inches in length to 72 inches, and ¾ of an inch to 4 inches in diameter.

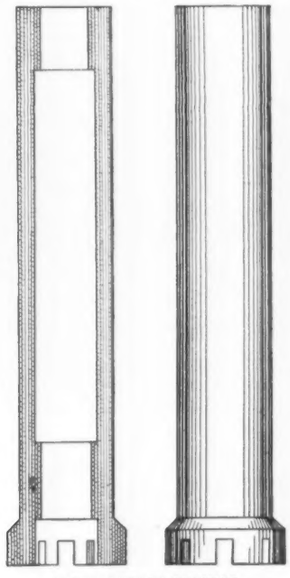
A number of mills are taking these cloth tubes in carload lots. Some bleachers are using them in connection with continuous bleaching process. The cloth wound on these tubes is placd on a stand so that it is readily unwound, passes through the bleaching process and is then rewound on the tubes as it emerges, making a continuous process without handling. When one roll is exhausted it is only necessary to sew on the head end of another.

There is a rapidly increasing tendency to put up cloth in rolls to meet the convenience of the subsequent user who may slit it into narrow widths or who wishes to lay it out in several thicknesses on the cutting tables, as well as for the convenience of the bleacher and dyer. There has therefore come about a demand for tubes for winding cotton, woolen, worsted and silk cloth as well as rubber and artificial leather.

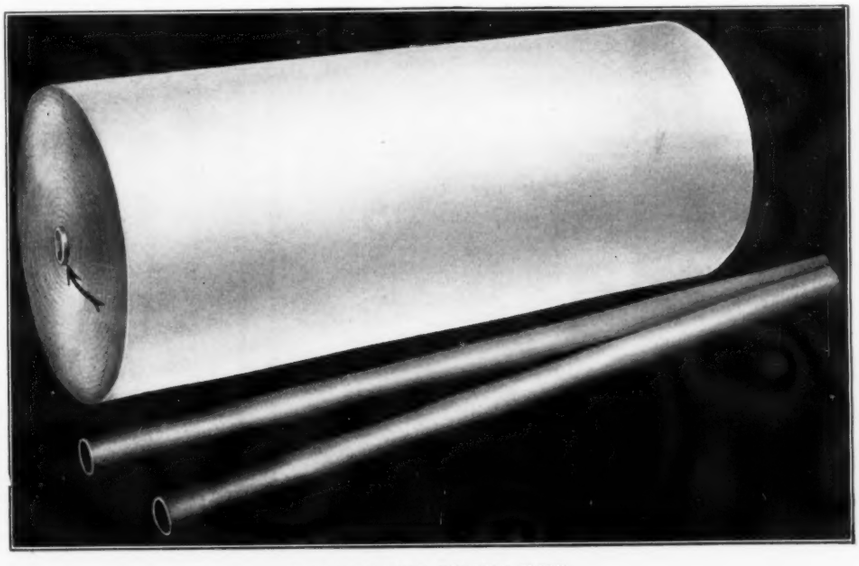
PAPER BOBBINS

Paper speeder bobbins are being introduced by the American Paper Bobbin Co., Inc., 670 Eddy St., Providence, R. I. After a great deal of experiment the process of manufacture, as well as the right kind of material, has been worked out satisfactorily, and the paper bobbins are giving satisfaction in a number of mills.

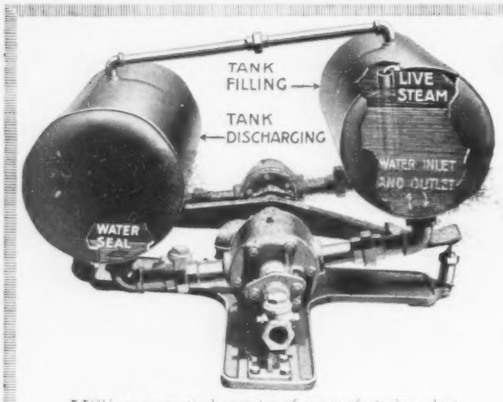
They are made in any size desired, and are claimed neither to split nor chip, thus doing away with the extra charges for rings or shields which are often used to prevent chipping and splitting. Neither will they swell, shrink or warp, as they are immune to all atmospheric conditions, and in consequence are, therefore, accurate in size



PAPER SPEEDER BOBBINS



PAPER TUBES FOR WINDING CLOTH



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101

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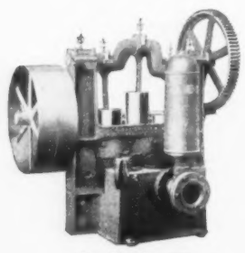
and for all other pumping services for Textile Mills, Bleacheries, and Dyehouses there is a Goulds Pump that will give you economical, efficient and reliable operation.

We will send you on request a complete set of bulletins describing and illustrating our entire line of Triplex, Centrifugal, Air and Vacuum and Deep Well Pumps.



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Goulds Fig. 3030
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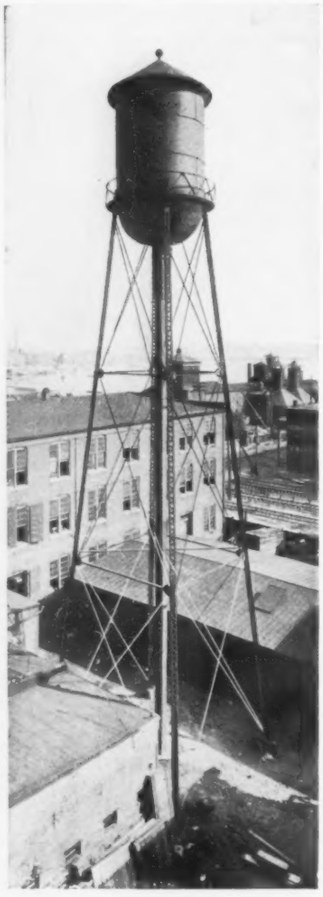

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When fire starts in your plant you will wish you had—or thank your lucky stars you have—a fire fighting equipment that really protects.

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That a sprinkler system connected to a hemispherical bottom elevated steel tank—a tank that will not rot, burst, burn or freeze up—is a combination that is unsurpassed for efficiency?

Do You Know—

That this equipment will save you enough in reduction of insurance rates to pay for the entire installation in five years, and that you will enjoy in the meantime the best possible security against fire?

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Producers and Exclusive Shippers of

Celebrated Admiralty New River Smokeless Steam Coal

used as a standard by the largest textile plants in the South

Average Analysis Admiralty During Past Year

Volatile matter	20.0 per cent.
Fixed carbon	76.6 "
Ash	3.4 "
	100.0 per cent.
Sulphur	.77 "
B. t. u.	15,270

SUPERIOR HIGH VOLATILE COALS
CANDO GAS & SPLINT

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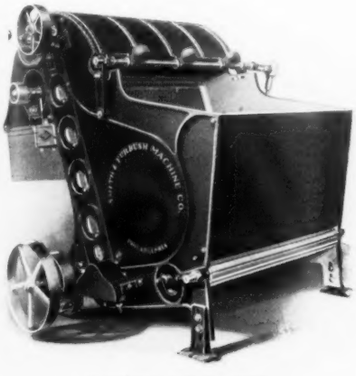
West Va.

at all times. Another claim which is made is that they will not absorb oil, thus insuring clean yarn, free from spots.

Already about sixty mills are using them, and very satisfactory reports have been received. Samples are furnished free upon request. The American Paper Bobbin Co., Inc., was formerly the American Textile Specialty Machinery Co., well known in the trade.

IMPROVED PICKER FEED

An improved picker feed for feeding all kinds of pickers, openers, lumpers, willows, dusters and fearnaughts is being offered to the trade by the Smith & Furbush Machine Co., manufacturers of picking, garnetting, carding and spinning machinery, at Philadelphia. The



IMPROVED PICKER FEED

new feed may also be used for feeding wool washers, but for this purpose it is built with a high top so that the wool will clear the comb before the beater strikes it. It is constructed practically of all iron and steel, making it durable and fireproof. The girts are of structural steel, the panels of sheet steel and the idler rollers of steel tubing. The frames are heavy castings, well ribbed to keep them straight. The only wood is that used for the apron slats.

The box for holding the stock is much larger than is usual in these machines. The apron rolls are all accessible and can be readily removed when necessary to renew the aprons. Self-aligning ball and socket sleeve bearings have been provided, allowing the machine to align itself to any settling and to run on less power. Gear covers are provided to prevent accidents. The apron slats are provided with steel wearing strips where they rub against the guides.

The feeder is built in any width desired. It is 7 feet 2 inches deep, but part of this overhangs the feed apron of the machine to be fed. The speed of the machine can be readily adjusted to suit the work in hand. The spike apron drive is arranged so that the gears can be changed without changing the length of the belt.

TIRE FABRIC TESTING MACHINE

During the year there were two important advances in the field of testing tire fabrics. The American Society for Testing Materials appointed a committee to prepare specifications for tire fabric tests and Henry L. Scott & Co., of Providence, R. I., brought out the new Scott tire fabric testing machine. Several of these machines have been delivered to manufacturers and users of tire fabrics, and have proved well adapted to the special requirements of the trade. The tests prescribed by the American Society can all be determined by this machine, which increases their practical value.

The tester is a dead weight machine and is power driven. It is of horizontal design and substantially and practically constructed. The rigid skeleton steel frame leaves all parts in full view and easily accessible. Every piece of the machine is built on United States standards and interchangeable.

EASILY OPERATED AND ADJUSTED

The stretch is obtained through a heavy steel screw at the rate of 12 inches per minute, reversing automatically, returning at a speed of 36 inches per minute. The length of stroke and distance between clamps is easily adjusted at the will of the operator. This machine is controlled by a single lever at the front, which enables the operator to stand squarely before the dial and start, stop or reverse the machine at will. It may be driven by a ¼ h.p. motor placed upon the floor beneath it and the power transmitted by a 1-inch flat leather belt. The pointer remains at the position of the break until reset by the operator. The resetting of the weight lever requires very little strength, as a long lever is provided at the head end of the machine, which makes its operation very simple.

The resetting mechanism is so constructed that it is entirely disengaged from all working parts of the machine during the test. This eliminates all friction and undue strain. Weight levers are suspended from splendidly constructed, self-aligning, hardened steel ball bearings, which are enclosed in dust-proof castings. The head carriage is ball bearing and is nicely counterbalanced.

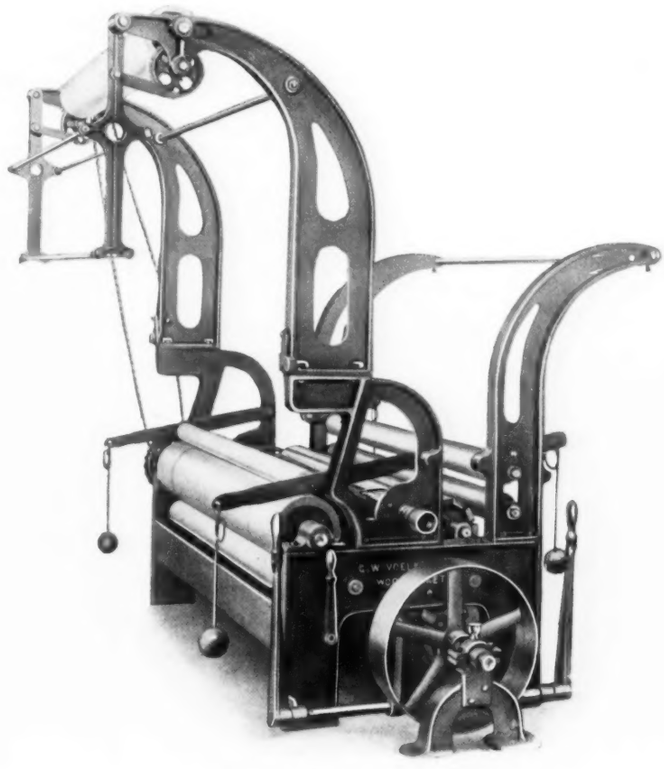
This machine can be built to any capacity desired up to 2,000 pounds. The resistance weights are made in sections and are easily removed from the weight lever. The rows of graduations can be provided on the dial, and by removing part of the weights a light and delicate machine can be obtained for tests on light material. Any style of clamp desired can be provided with the machine.

Five departments of the United States Government, as well as the French and Belgian Governments, are using these testers.

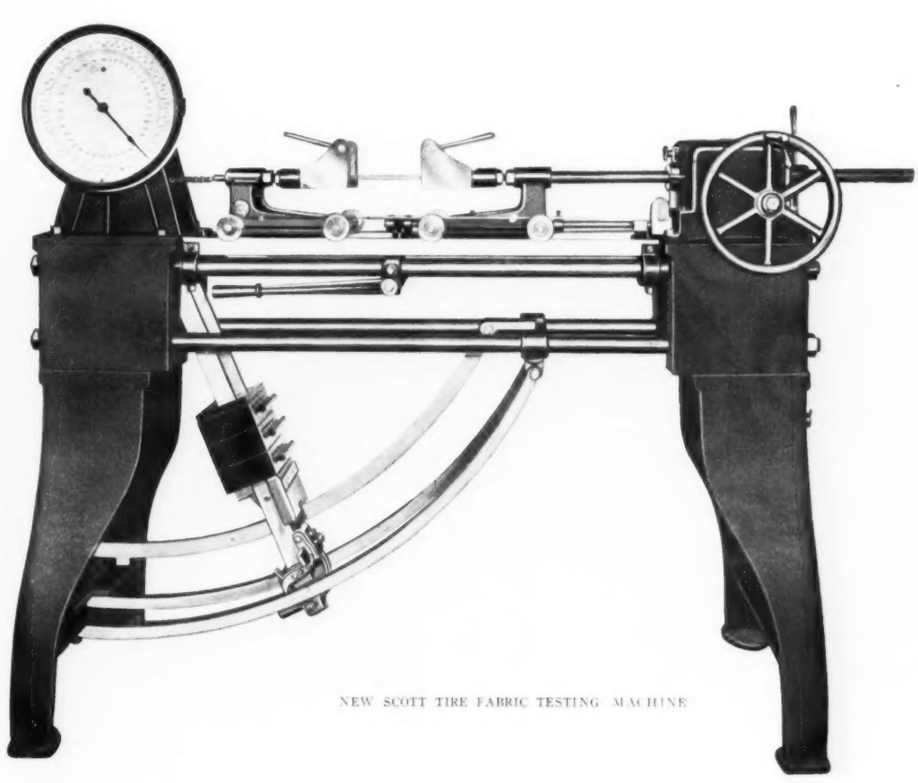
A VACUUM EXTRACTOR

George W. Voelker & Co., Woonsocket, R. I., are manufacturing a machine to extract cloth in the open width, performing the work done by a hydro-extractor and at the same time preventing wrinkles and saving labor. The machine works on the vacuum principle and operates at the rate of 20 to 25 yards per minute on woolens and worsteds. It is in successful operation in a number of woolen and worsted mills, and, while designed particularly for woolens and worsteds it can be used on any class of textile fabrics that can be extracted in the open width. The concern is also building crabbing machines with a vacuum pump extractor, thus crabbing and extracting the cloth ready for the dryer in one operation.

In the new vaccum extractor the cloth first passes between two squeeze or grip rolls that eliminate a large part of the contained moisture, then under a reciprocating slot stretcher, and then over a slotted pipe, one end of which is con-



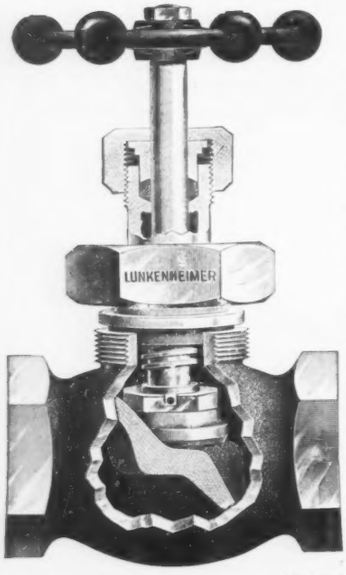
VOELKER VACUUM EXTRACTOR



NEW SCOTT TIRE FABRIC TESTING MACHINE

LUNKENHEIMER
Regrinding Valves

"The best by test"



The years of satisfactory service to the many users prove them to be the best the market affords. From their very inception—and they are **the original Regrinding Valves**—they have met with favor by discriminating Engineers everywhere.

The original features of design remain the same; we have, however, by the aid of our chemical and physical laboratories, made slight changes in the composition of some of the parts, which the use of higher pressures and temperatures have warranted.

Our aim has been to make each part particularly for the duty it performs, so that the several parts when working together will give the greatest service possible. That we have achieved our aim is attested to by thousands of satisfied users, who **know** from experience that Lunkenheimer Regrinding Valves are without an equal for durability, and that it pays to "Buy the best—they are the cheapest."

Globe, Angle and Cross Valves; Horizontal, Angle, Vertical and Swing Check Valves, for working steam pressures up to 200 and 300 pounds.

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THE LUNKENHEIMER CO.
"QUALITY"

Largest Manufacturers of High Grade Engineering Specialties in the World

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Patented Cone Pulley Transformers

Remove Taper Cone Driving Troubles

These flexible bands of leather change cone pulleys to high faced pulleys; the inner surface of the Transformers is self-adjusting to the cone pulley.

They eliminate the difficulty from driving belts on taper cone pulleys and the necessity of narrow belts. Belts of any kind or size up to width of transformers can be used.

No end thrust or wear on the belt saves loss of power caused by friction.

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THE MOORE & WHITE CO.

PHILADELPHIA, U. S. A.

Manufacturers of the well known Moore & White Friction Clutches

THE

Climax Anti-Freezing Hopper

An ideal out-door toilet. Is different and better because it

has no stuffing box with piston and packing to get wet, freeze and cause trouble

No heavy spring—consequently no strain on any part.

A five pound weight placed on seat will hold flush and waste valve closed, and supply valve open against 200 pounds water pressure.

Will not waste water until seat is permitted to rise, flushes thoroughly, empties quickly, draining all parts above frost line. All water ways are 1¼ inch and unobstructed.

No Pit, and never necessary to excavate. All parts, including supply valve seat, removed through opening in top of Hopper.

Seat automatically assumes vertical position, is dry and sanitary.

Specify and Recommend the CLIMAX

THE G. A. KEMP MFG. CO.
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STEPHENSON BAR BELT DRESSING
PRESERVES BELTS - PREVENTS SLIPPING

LOOM FIXERS

Your Supply Box is incomplete without it.

Does not fly around and make grease spots on your warps.

Sold on merit only, as the price is higher than most.

Write for free half pound, or to save time, order 30, 50 or 100 lbs.

Sole Makers

STEPHENSON MFG. CO.

Albany, N. Y.

nected to the vacuum suction pump. The latter is claimed to be as effective in the removal of moisture as the centrifugal extractor. The cloth is then led over a 10-inch drum and can be either wound or rolled, or led up through a folder which delivers a fold 28 inches wide.

CLOTH PICKING OR SHEARING MACHINE

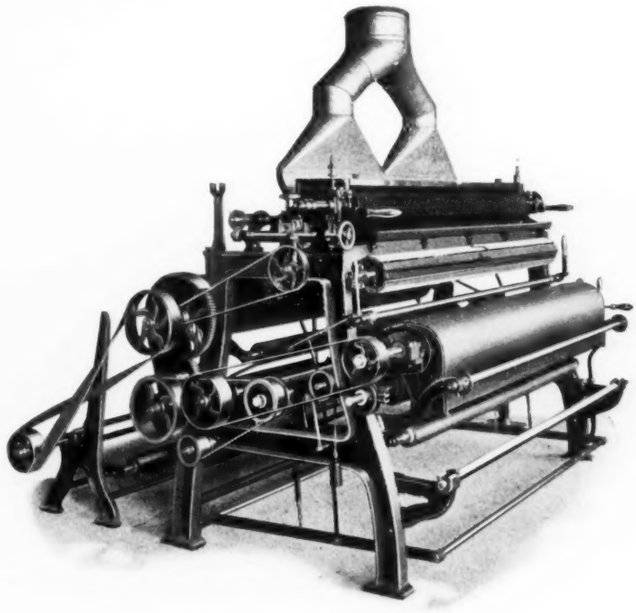
During the past year the Curtis & Marble Machine Co., Worcester, Mass., have given particular attention to bringing out their cloth picking or shearing machine for silk goods, which are used for clearing threads, knots, bunches, etc., from the surface of silk goods after coming from the loom, thus dispensing with hand work. Machines for this purpose have been used in different countries in Europe, and to a great extent have superseded hand work on many classes of silk fabrics.

The Curtis & Marble Machine Co. have made a careful study of this process, and their machine has been designed on the most improved principles. The builders are confident that it is unexelled both for workmanship and the quantity and quality of the work turned out.

The cutting parts, which are a vital element of the machines, receive most careful attention, and are unsurpassed in their quality, temper and finish. Any needed repairs to the cutters and other parts of their machines are quickly available, and the difficulties and delays incident to obtaining supplies are done away with.

The picking or shearing machines will do good work on both skein dyed and piece dyed goods. They occupy far less space than would be required for hand pickers for doing this same work. Provision is made for quickly raising the cutting parts when seams pass over the cloth rest, to avoid cutting the goods where they are sewed together at the ends After a seam has passed the blades are easily lowered again to the former position. A stop-and-start motion, with handles at each side of the machine, is provided for the draft roll that draws the goods through the machine, so that this roll may be instantly stopped and started while the other parts of the machine are in motion. This allows the revolver to obtain full speed before commencing to shear, and also enables the operator to stop the cloth instantly at any desired point. This very convenient feature is not usually found.

The machines are built in different widths, as required; the most common widths being for 40, 45 or 54 inch goods, though machines either narrower or wider than this are easily furnished.



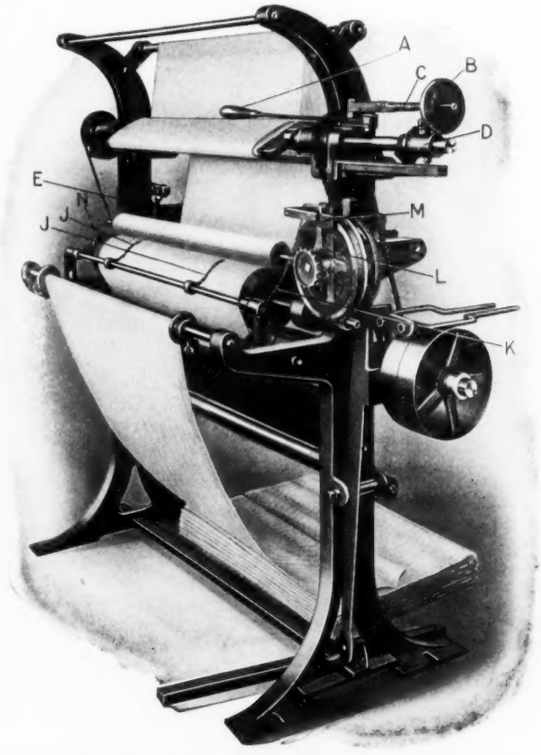
MACHINE FOR SHEARING OR PICKING SILK GOODS

NEW LANCASHIRE CLOTH WINDER

The Parks & Woolson Machine Co., Springfield, Vt., have attempted in this machine, with all its various specialties, to cover the entire marketing needs in winding cotton, woolen and silk fabrics, except trade marking and yard numbering. These two processes are embodied in another model.

NEW FEATURE

A new and desirable feature in this winder is the quadrating dial that records the yardage length of the cloth being wound. A pin on the dial may be instantly set at predetermined points when changing from one kind of cloth to another. This is only used when there is a considerable difference in the weight, thickness or elasticity of the goods. A piece of cheesecloth can be followed with a cut of chinchilla, and then a ladies' cloth, letting the pieces come haphazard without delaying the operation of the machine and all with precision in measuring. Ordinarily this attachment is not used and its presence hinders not at all. When for any reason a readjustment of the measurer is to be made it can be done quickly and reliably. There are no resanding of rolls, readjustment of expansible pulleys or drums. It is positive so there can be no slip.



CLOTH WINDER ESPECIALLY ADAPTED FOR WOOLENS

QUICK ACTING BOARD GRIP

Another strong point is the quick acting board grip which is so handy that different board lengths can be run indiscriminately without delay. It is also self-relieving after notching board against slipping from jaw slots so it will not split boards or thrust too heavily on shaft bearings.

The threading of the machine is extremely simple, all from the front without moving from position. The winder is driven by silent running chain; a spring equalizer neutralizes the jerk of winding on wide boards. The driving belt is shifted by foot lever, leaving the hands free for guiding the cloth and starting and finishing the package.

DESCRIPTION OF ILLUSTRATION

The illustration shows a machine especially adapted for woolens with 9-inch quadrating dial. It has automatic stop to measurer operated when tail-end of cloth leaves measuring roll used when rethreading for each piece of cloth. Attachments are furnished for inspecting both faces, cutting out damages, automatically winding into packages of predetermined yardage all in one operation, and for varous other purposes.

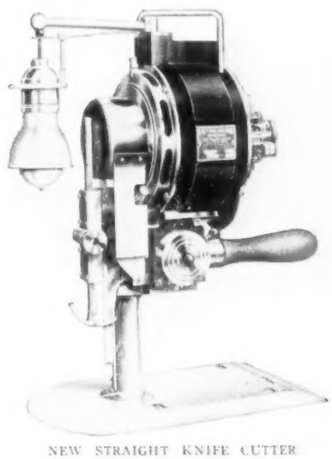
NEW EASTMAN CUTTER

A new model Eastman cutter of the rotary type with four inch diameter knife has been brought out by the Eastman Machine Co., Buffalo, N. Y. It is designed particularly to take care of low lays where a light, fast machine is required.

This machine is claimed to be the lightest weight four inch diameter knife rotary cutter on the market, weighing but a few ounces over fifteen pounds. It has proved in actual tests that it is just as strong as any of the old style machines which weigh nearly twice as much. This new Eastman cutter has an enclosed self-ventilated motor guard that absolutely protects the operator from coming in contact with the knife and a sharpener so arranged that the knife can be sharpened without moving the guard in the least. The cutter is also equipped with a guard for the back of the knife, which is a new feature. This rotary model is for use where the majority of the lines to be cut are straight and the lays are not high.

ROTARY CUTTER

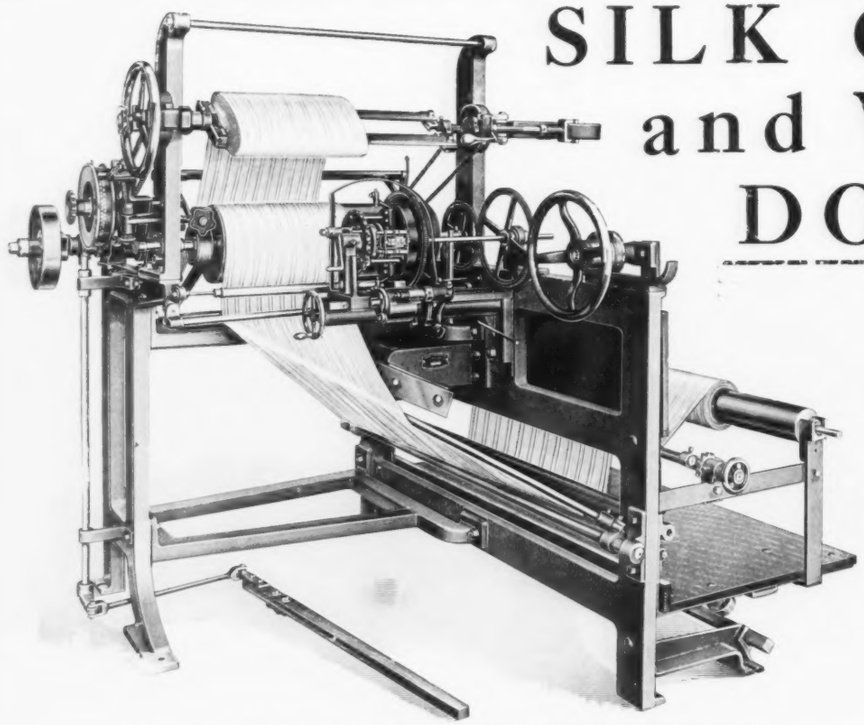
A new model straight knife cutter is also being offered. This machine while somewhat similar in appearance to former models, embodies a number of improvements. The principal one is the detachable presser foot clamp, and this clamp is also a combination of a spring clamp and a rigid one and can be used either way according to the will of the operator. This new model straight knife Eastman cutter is completely enclosed, all moving parts being protected so that it will not throw oil on the goods, and there is not a wire exposed. It is also fitted with the new swinging lamp bracket. It is for all around use, no matter whether the lines to be cut are straight or curved, and it will take care of lays from a few thicknesses to 6 inches in heighth.



NEW STRAIGHT KNIFE CUTTER

Eastman cutters were awarded the gold medal at the Panama-Pacific Exposition, the award being based on simplicity of design, quality of material used, durability and actual performance.

SILK COTTON and WOOLEN DOUBLING



SPRINGFIELD DOUBLING WINDER WITH TRADEMARKING & YARDNUMBERING

We have three different cloth doubling machines

Springfield Doubling Winder

N Y Fabric Packaging Machine

Measuring Doubling and Winding Machine

Our representative is in N Y City every week Let him call

Let us show you our automatic tensionless measurer with magnetic feed especially for silk doubling and winding

PARKS & WOOLSON MACHINE CO Springfield Vermont

AMERICAN
STEEL SPLIT PULLEY

Pressed steel is admittedly the very strongest metal—weight for weight.

American Steel Split Pulleys are pressed steel.

Light—
Strong—
Simple—

The engraving shows why they are strong, from the standpoint of design.

It shows why they are light, and shows also their simple construction.

And the fact that over 2½ million have been marketed is ample evidence of the service they give.

We will gladly tell you everything about these pulleys, and send you a catalog and prices as well.

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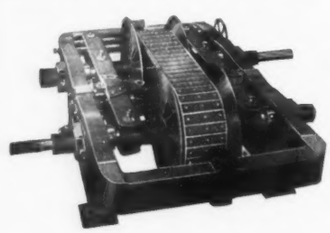
HUNDREDS OF TEXTILE MILLS HAVE PUT THEIR O. K.

On "The Reeves Way" of controlling the speed of Textile Machinery.

In every Textile producing State of the Union, in every country on the Globe, they are using

"The Reeves" **Variable Speed Transmission**

to regulate the speed of their Dryers, Tentering Machines, Printing Machines, Mangles, Mercerizers, etc.



They know what an advantage it is to regulate each machine and get any speed without stopping.

They know it saves money and increases their output.

We know that's what it will do for you.

Write at once for Catalog "U"

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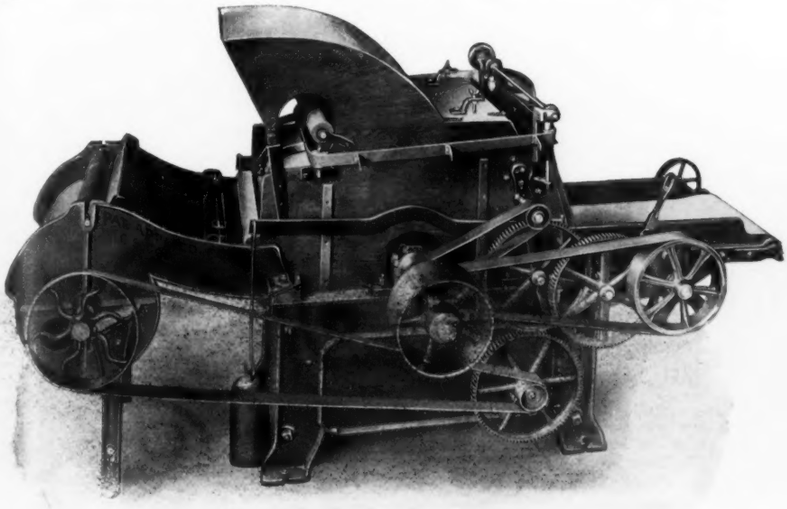
EASTERN AGENTS:
Lewis E. Tracy Co., Boston
Patterson, Gottfried & Hunter, New York City
W. E. Shipley Machinery Co., Philadelphia

AN IMPROVED PICKER

A new improved picker which combines many advantages in operation has been brought out by C. S. Dodge, Lowell, Mass. A notable feature is an overshot condenser. The picked stock passes continuously in the same direction as started on the feed apron, thus leaving the entire floor at the feed end of the picker for the unpicked stock and the back or other end for the picked stock, which issues in the form of a lap and can be carried in sheets or endless aprons to any part of the mill.



DODGE PICKER WITH BIT ATTACHMENT AND OVER-SHOT CONDENSER

While it is practically a new departure, all the mechanical equipments remain the same so that all parts are interchangeable. The machine is of sturdy build, of convenient design and construction and well adapted to fill all the requirements of this class of machinery.

CRABBING AND LUSTERING MACHINE

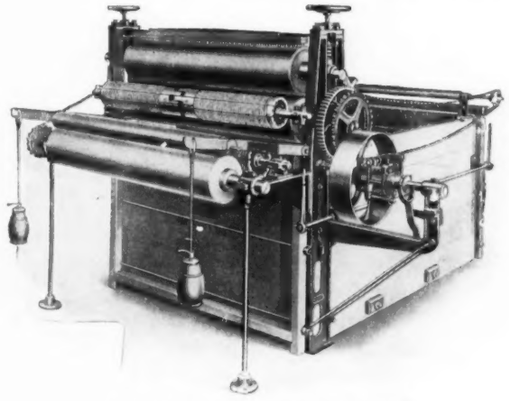
Large capacity and a superior finish have been accomplished in the development of the Dunn crabbing and lustering machine, built by the Rodney Hunt Machine Co., Orange, Mass., and brought out during the year. A cut of cloth can be put through the machine in four minutes, including the time taken in putting the cloth in and transferring the rolls to the setting rack. The treatment given the cloth does away with cloudy effects due to uneven steaming, sets the goods and adds to the luster and feel. In one continuous operation the cloth is subjected to heat, moisture and pressure necessary to give the finish, and opportunities for wrinkles and creases are removed.

The pieces are fed into the tub over a roll, which revolves a little faster than the squeeze rolls, so that the goods are loose in the tub. A little attention from the attendant at the entrance end of the machine insures the goods being straight. After passing over the several rolls in the tub the piece is drawn out and over the first stretcher roll, which draws out the width. The machine is not intended to increase the length of the goods and will not do so unless especially arranged. From the first stretcher roll the piece passes between the two large rubber-covered squeeze rolls which take out the excess water. The moist cloth then passes over two more stretcher rolls which open it to full width. All cockles and wrinkles are taken out, and while hot and steaming and at full width the piece passes over the receiver or supporting roll, from which it is rolled tightly and smoothly on the beam.

The beam is removed when the required number of pieces have been rolled on it and taken to the setting rack, where the pieces are allowed to set, and a luster is formed which is very desirable for certain kinds of finish. Pendulum weights hanging from levers keep the goods on the beam pressed solidly.

While the cloth is passing through the tub and over the first stretcher roll bunches of loose fiber are likely to collect and be carried along with the cloth. To prevent these loose fibers coming back on the cloth a brush extends the length of the upper squeeze roll so that the fibers will adhere to the brush, become rolled into small balls and drop into a receptacle or trough from which they are removed at intervals.

This machine will carry from 100 to 120 50-yard pieces of goods per day. It is made in four sizes, for goods up to 78 inches wide. Attachments for cooling and steaming are furnished when required.

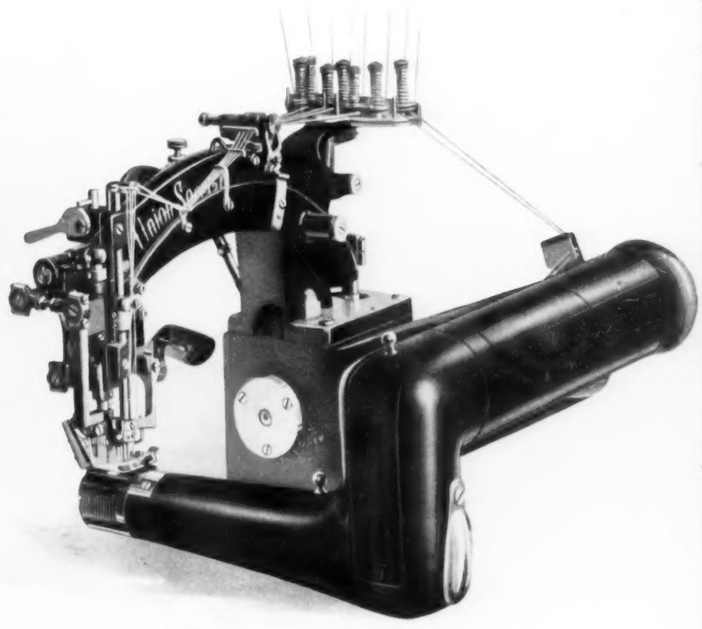


CRABBING MACHINE—DELIVERY END

NEW FLAT SEAM MACHINE

The Union Special Machine Co., Chicago, Ill., and New York, has placed on the market a new Tandem Interlock flat seaming machine that produces a flat and elastic seam with no resulting ridge. The machine is extraordinary in its ease of operation and embodies a combination of high grade mechanical features. It requires no special brand of thread and no bobbins are necessary as the machines take the thread directly from the cones.

When the first model machines were tried out in a few knitting mills, the knit goods manufacturers were not ready for the flat seam and could not see any advantages in it. The idea has grown, however, and with the introduction of the new Tandem Interlock several months ago a demand has been experienced which shows that the old objections have vanished and the machines have been installed in a large number of mills.



UNION SPECIAL FLAT SEAM MACHINE

CONSTRUCTION

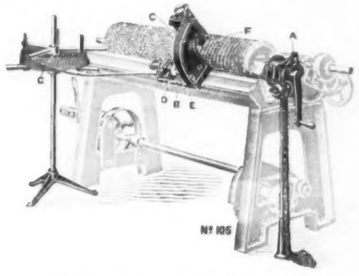
The Tandem Interlock is of the same novel construction as was shown several years ago, and includes the feature of joining the two edges of the fabric together in one operation and feeding the same off from the cylinder work plate of the machine, thus making a perfectly flat seam, with the edges securely joined and doubly covered at the meeting line. By this operation the so-called whiskers or cut loops of fabric cannot protrude through at the meeting line of the seam, which would, of course, be a very valid objection.

The framework of this machine is arranged so that the operator can accomplish her work with the least amount of fatigue. She faces the machine squarely in a normal position. This machine is made with the same care as to high speed and durability as characterize all other Union Special machines.

The details of operation have been very carefully worked out for the expeditious handling of the garments. The stitch-forming mechanism, while novel, is of a construction that can readily be taken care of by the ordinary mechanic. It does not require the services of an expert to readjust this machine, nor does it require the use of specially prepared thread. Some of the special features of the machine may be summarized as follows: Flat elastic seam, with no ridge resulting; combines seaming and cover seaming in one operation; construction of frame permits easy handling of the garments; finished seam on both sides of material; cut edges of fabric are hidden by the ornamental but durable overseaming; improved design and skilled workmanship permits high speeds; cylindrical type of machine simplifies operation of seaming tubular work; special feeding device provided to prevent puckering of the material; seaming operations accomplished on one machine, saving cost of transferring goods from one machine to another; automatic trimming mechanism for preparing the edges of the fabric for reception of the stitches; product direct from cylinder saving the interval of time necessary to take the goods off the cylinder, as was necessary in the old way; edges of the frabric are neatly and firmly joined together without a ridge; all parts made with precision to render them interchangeable for repairs.

WIRE MOUNTING MACHINE

Dronsfield Bros., Ltd., Oldham, England, have built a new machine for reclothing lickers-in at the mill. It has recently been improved by adding a device for reclothing or remounting new wire when the old wire has become badly worn or damaged. When it is desired to repair old wire the mounting



THE DRONSFIELD MACHINE FOR RECLOTHING LICKERS-IN

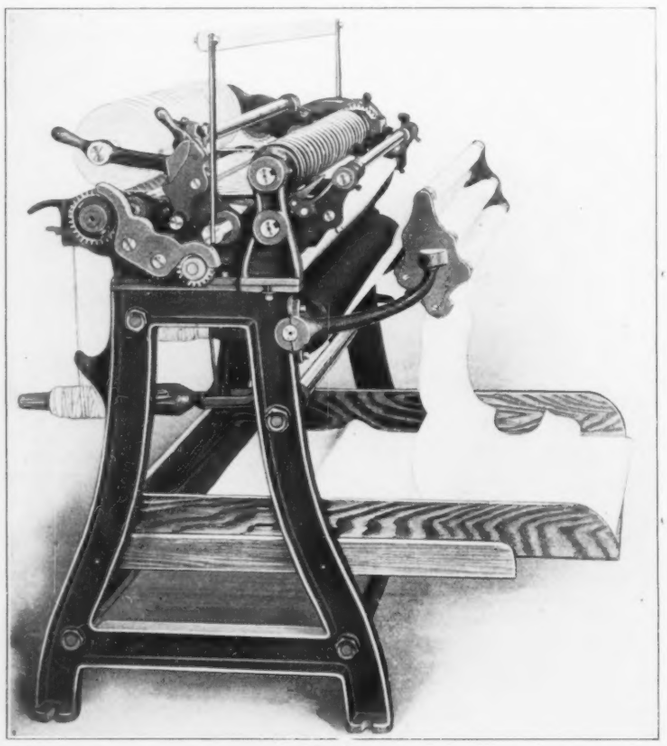
head is replaced by a dressing tool. The apparatus can be fitted on the licker-in grinding and dressing machine without making any alterations.

An improved machine for pointing skewers for sliver bobbins is also being built by Dronsfield Bros., Ltd. This is believed to be the first machine of its kind to be placed on the market, and it has proved its value in English mills by reducing the skewer costs on the one hand and improving the spinning on the other hand.

IRELAND CLOTH CUTTING, FOLDING AND WINDING MACHINE

A machine especially designed for cutting, folding and winding cotton or woolen fabrics, knit goods, etc., for bindings, facings, fronts, button stays, either straight or bias, was recently placed on the market by the Ireland Machine & Foundry Co., of Norwich, N. Y. It is in use by a number of knitting mills which are cutting and folding for themselves the bindings, strips, etc., which they formerly had done outside. Important advantages in labor cost and production are features. Furthermore, one manufacturer gained about 11 per cent. of the cloth over the old method of cutting and being able to cut exactly the quantity needed each day he avoided the necessity of carrying such a large surplus stock of trimmings.

With the new model of this machine an entire change from one size or style to another may be made in from three to five minutes. There are no separate



THE IRELAND CLOTH CUTTING, FOLDING AND WINDING MACHINE

disks between the rolls which results in saving of time in removing finished rolls and starting new ones. The disk cutters are self sharpening and all cutting, folding, ironing and winding is done on top and in full view of the operator. A new and simple spreading device stretches the cloth to the full width and takes out all wrinkles. The drive roller guides insure cutting the exact width from the start so there is no waste at either end and practically no waste on the selvage. The power required is ¾ h.p. and the floor space occupied is 5′ 6″ by 3′ 6″.

"NEW WIND" DOUBLER

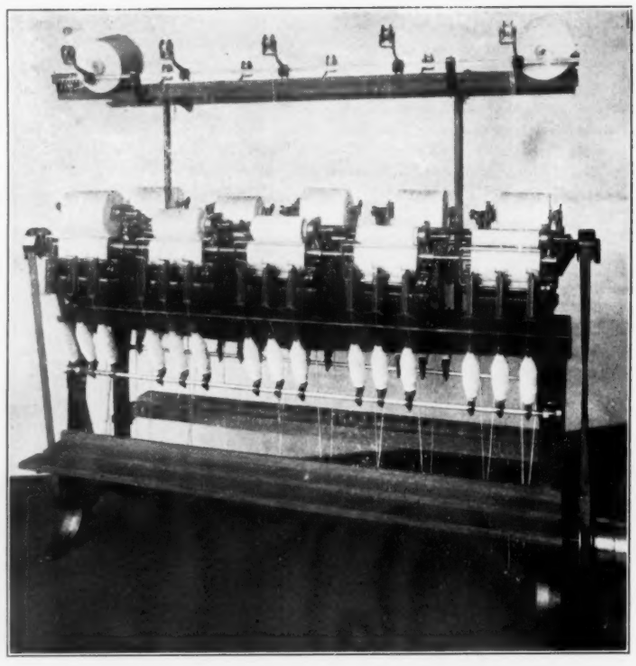
A new doubler is being put on the market by the Universal Winding Company of Boston, for the doubling of yarns preparatory to the operation of twisting. This process is growing in importance since the expansion of the tire fabric industry. This machine really represents a new method of winding, combining the advantages of the well-known "Universal" system so far as the uniform laying of the yarn and the making of a compact package are concerned, and the advantage of friction driving where constant speed of yarn delivery is desirable, as in this special class of work.

It is believed by well-informed experts that it will be an important factor in improving the quality of ply yarns through the yarn being wound with uniform tension on each strand and delivered to the twister spindle under the most favorable conditions. The machine was exhibited for the first time at the Southern Textile Exposition in Greenville, S. C., where it atracted a great deal of attention.

The textile industry the world over has long sought a method of doubling yarn which would be less wasteful and subject the yarn to less wear and tear than in the spooling process, or any other method heretofore known. Undoubtedly the "New Wind" doubler will meet this long-felt want and, like all parts of the "Universal" system, will be hailed as a long step forward in the scientific handling of cotton, woolen, worsted, linen and all other fibers.

FULLING AND WASHING MILL FOR KNIT GOODS

A portable fulling and washing machine especially designed for treatment of knit goods of all kinds, including hosiery, jackets, caps, lumbermen's felt boots or felt cloth, has been placed on the market by Sargent & Tufts Manufacturing Co., a new firm succeeding to the business of William C. Bull at Bennington, Vt. The business has been run for more than twenty-five years making a specialty of fulling and washing machines. The new firm will continue these lines which include several



THE "NEW WIND" DOUBLER FOR YARNS

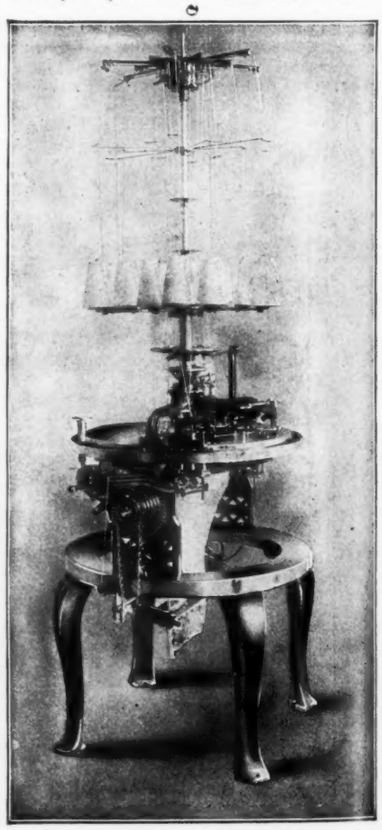
types of machines, not only for handling the made-up garments, but also for washing the cloth in the roll. They build a large type of mill for scouring and fulling felt cloths, also dye tubs, vats, mill trucks, etc.

The new portable fulling and washing machine has a capacity of carrying batches of 100 to 125 pounds and operates at a speed of 90 to 100 revolutions per minute. Larger size machines are made for carrying a greater quantity of goods, as may be required. The hot and cold water connections are made through specially prepared water ways on the rear side of the machine; being so taken into the body of the machine through spray outlets, the entire surface of the goods in each end of the machine receives a uniform flow of water, the mixing valves being so manipulated as to deliver water at any temperature desired. These machines are so constructed the beaters will run parallel with each other and the sides of the tub, overcoming what has heretofore been a source of wear on these parts and a cause for goods getting caught and damaged, and making the machine run much easier, with less power, and without risk of broken beater arms. All machines are erected, adjusted and operated before leaving the works, explicit instructions given for their erection, so that any mechanic will be able to install them without difficulty. The particular feature of merit is the provision for convenient and permanent adjustment for all wearing parts and perfect alignment of beaters, insuring long service and convenient operation.

NEW SWEATER MACHINE

A new latch needle ribbed sweater machine has been put on the market by the Tompkins Bros. Co., Troy, N. Y. Although the latch needle end of the business is a new line for them they have in their new machine upheld the tradition of the firm for turning out an accurate, efficient and well finished article. The construction involves many new and ingenious principles which have enabled them to produce on one machine fabrics which have heretofore been made by using three different machines.

The machine is designed to knit plain, tuck and rack stitches, and is equipped with stripers and separating course attachments and also has tightening and loosening devices, by which it is possible to get stitchers of three distinct lengths. The machine has been thoroughly tried out for the past three years in the plant of N. J. Rich & Co., large manufacturers of sweaters at Cleveland, O., where a complete range of sizes has been in daily operation. The basic principles of the machine as well



NEW TOMPKINS SWEATER MACHINE

as many of the individual features are covered by patents and several other patents have been allowed and others are pending.

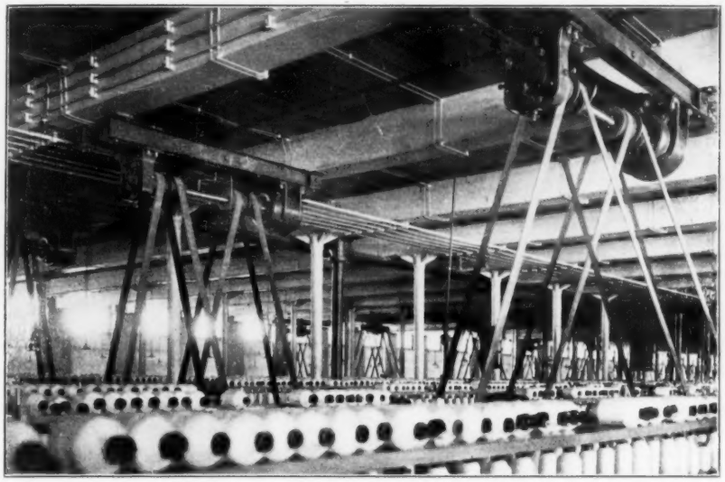
The principles involved are by no

means restricted to the manufacture of sweaters, but for the time being it is the intention of Tompkins Bros. Co. to confine the output on this machine to sweater fabrics.

Operation is entirely automatic. All changes are controlled by the pattern wheel, which is of simple and rigid construction, and from which a very simple record may be kept of the details of the garment manufactured.

NEW POWER APPARATUS FOR TEXTILE MILLS

Special textile motors and control equipment are being constantly improved by the General Electric Company. The new types described in the following paragraphs have been subjected to the most severe tests possible by users.



NEW TYPE BALL BEARING 4-FRAME MOTORS DRAWING SPG. FRAMES AT EVERETT MILLS. FORMER TYPE 4-FRAME MOTORS IN BACKGROUND

NEW FOUR-FRAME MOTOR

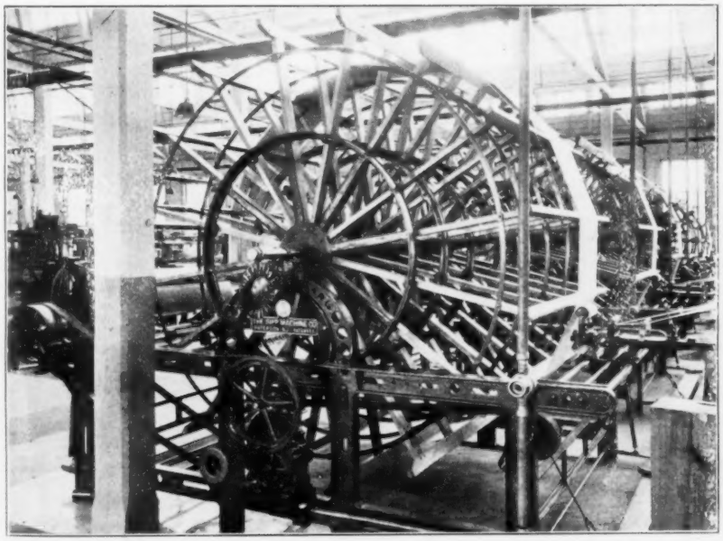
A new four-frame motor, best described as "a universal four-frame motor" has been brought out for driving, roving, spinning and twisting frames. The motor shaft is extended at one side of the motor only, and is supported at the end by a separate bearing. This arrangement gives perfect flexibility of pulley spacing, and adapts the motor for driving two, three or four frames with practically no restrictions as to spacing of frames. The advantages of this construction are apparent in connection with the machinery layout of new motor-driven mills, and this type of motor is of special value in the electrification of existing mills where the rearrangement of the machinery might be either very difficult or impossible. These motors are semi-enclosed, have ball bearings, high efficiency, high power factor and very close speed regulation.

ADJUSTABLE SPEED MOTORS

Adjustable speed motors of the brush shifting, single-phase type, geared direct to individual machines, are finding a wide field of application in textile mills. Silk throwsters, especially, appreciate the ability of these motors to take care of the variation in different batches of silk and changes due to weather conditions. The operator, by a simple adjustment by hand, can change the speed as desired within required range.

A new type of motor for pickers has been developed. This motor has a high efficiency and many special design features which a study of picker requirements has shown to be advisable.

Loom motors with high efficiency, high power factor, and close regulation, are being furnished in large quantities. These motors are of the totally enclosed, waste-packed bearing type, and are arranged for conduit wiring. These features, originated by the General Electric Company in this class of service, have proved to be indispensable.

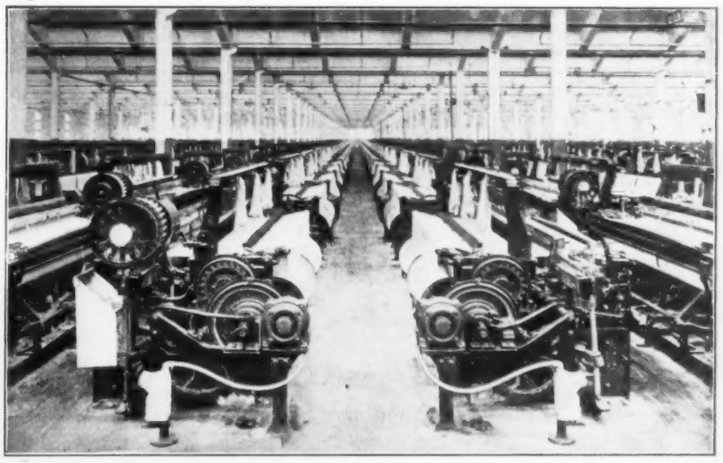


BACK-GEARED MOTOR DRIVING HORIZONTAL SILK WARPER AT EMPIRE SILK CO., WILKES-BARRE, PA.

Adjustable speed three-phase motors which can be regulated to give an almost infinite number of speeds within desired ranges have been developed and installed in a number of mills, bleacheries, dye and print works. These motors are standard in 5, 7½, 10 and 25 h.p. sizes.

For silk warpers a special back-geared motor has been used with signal success. Due to this application the thread breakage at starting has been greatly reduced or eliminated. The silk mills using this drive have been greatly pleased at the results obtained.

Curtis turbines continue to be increasingly popular with textile mills who appreciate reliability, high steam economy and extraction features. The Hamilton Woolen Co., Southbridge, Mass., were operating boilers merely for the purpose of generating low pressure steam for use in their dye-house and heating. This steam will now go through the high-pressure stages of their new 1000-kw. Curtis turbine, generating electric power. It will then be extracted for use in the dye-house. A large amount of power is thus obtained for a very small cost, as the turbine is practically used as a pressure reducing valve. A reciprocating engine was wrecked at the Ashland Cotton Co., Jewett City, Conn., shutting down their whole steam power. A Curtis turbine was shipped within one week from date of order and was placed in service immediately.

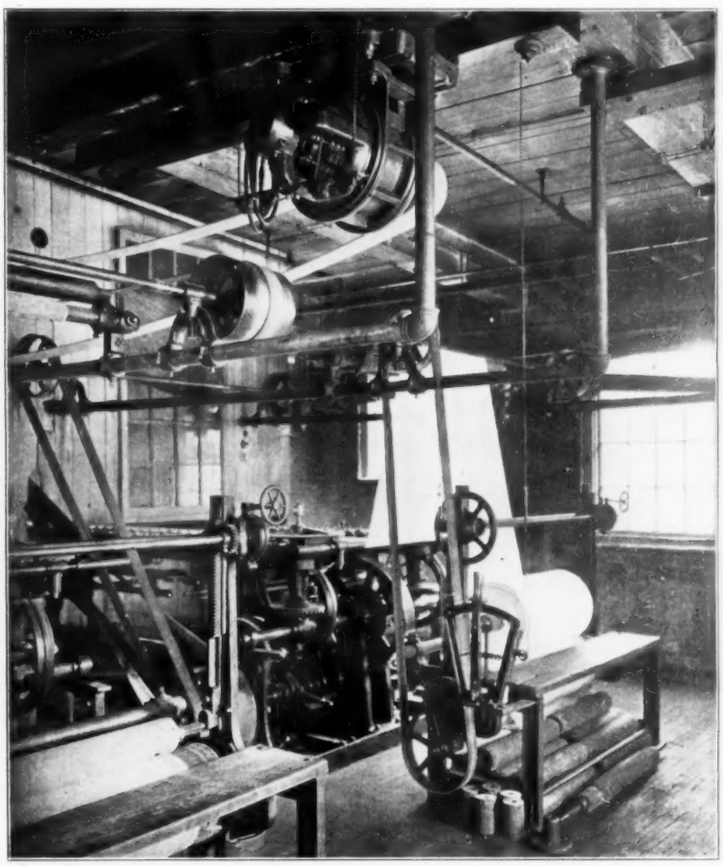


DRAPER LOOMS AT NAUMKEAG MILLS INDIVIDUALLY DRIVEN BY TOTALLY ENCLOSED GENERAL ELECTRIC LOOM MOTORS

STARTING SWITCHES, ETC.

Starting switches recently developed for G-E alternating current textile mill motors are inexpensive, durable and safe.

A push opens and a pull closes the CR 1038 switch which is used for connecting small alternating current motors directly to the line in sizes 3-h.p. 110, 440 and 550 volts, and 5-h.p. 220 volts. This switch has hinged covers which



VARIABLE SPEED MOTOR OPERATING TENTER FRAME AT WINDSOR PRINT WORKS

open at the top to allow inspection of the switch blades and at the bottom to facilitate easy replacement of protective plugs. These covers cannot be opened unless switch is open, and the switch cannot be closed with either cover open. A lock and key mechanism can be provided to lock covers closed or the switch open.

A new type of protective plug guards the motor against overloads. It has a time limit feature and is renewed at a remarkably low cost.

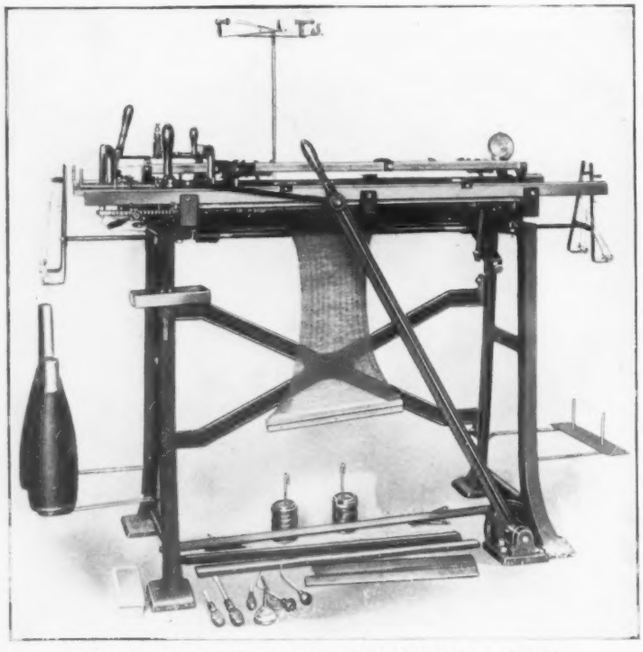
A new drum type switch known as the R 178 is being used to replace knife switches. It has all electrical parts enclosed, a strong mechanical construction and all the well-known advantages of the drum type controller at a very low price. It is furnished either reversing or non-reversing in sizes 1½-h.p. 110 volts, 3-h.p. 220 volts, 5-h.p. 440 volts and 7½-h.p. 550 volts.

P-10 oil switches have all moving parts, except the handle, totally enclosed to eliminate fire risk and are very low-priced. They are adapted to 550-volt motors up to 10-h.p.

The switches are furnished in four forms as follows: Non-automatic; with or without low voltage release; with or without overload release; trip free from handle.

PEARL STITCH KNITTING MACHINE

A new links and links or pearl stitch knitting machine is now being built in this country by the Grosser Knitting Machine Co., 260 W. Broadway, New York. Before the war started a well equipped plant was manitained to build and transform knitting machines. This has been increased in mechanical equipment as well as in the force of experienced mechanics continuously turning out a number of special flat knitting



THE GROSSER IMPROVED PEARL STITCH KNITTING MACHINE

machines for silk sweaters and other novelties.

The shortage of machines of the links and links type made it advisable to go into this particular field. Several striking innovations in the construction of the machines are now controlled by the Grosser Knitting Machine Co., through patents and royalty agreements and will be incorporated in the new machines under construction. One of the striking features is the entire elimination of the troublesome jack lifters hitherto used on links machines. A patented, hinged sinker is used, assuring accurate work and permitting the operation of the machines at a much higher speed. Needle breakage is practically eliminated and the goods are turned out perfect in pattern and design.

POMPON MACHINE

Another new machine manufactured and sold by the Grosser Knitting Machine Co., is for making pompons for toques, caps, hoods, scarfs, slippers and other ornamental purposes, which are so much called for in the present styles. This is a compact little machine, no bigger than a sewing machine, and can be placed on any sewing machine table. It requires only ⅛ h. p. to drive it and runs at speed of 1000 to 1200 revolutions per minute. No shearing or trimming is required and there is no waste of material.

SCOTT & WILLIAMS, INC., DEVELOPMENTS

During the year 1915 the remarkable system of seamless hosiery machinery, introduced by Scott & Williams, Inc., Boston, has been rounded out and developed so that now women's hose, half hose and misses' hose may be produced on these machines with a minimum of labor and waste, and at a lower cost.

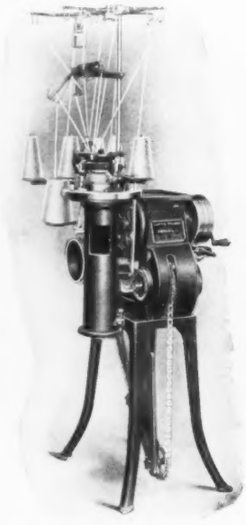
To summarize the developments made by this concern: When the year 1915 opened, Scott & Williams, Inc., had already placed on the market their models B, Q, O and F, which are so well and so favorably known as to need little further description, embracing not only plain machines for string work and hand transferred hose and half hose, but the "anti-run-back" and turned welt hose, and half hose made without a transfer. In January they introduced their Model G, which produced an improved form of automatically transferred hose and half hose, which has proved an economical substitute for goods made by the method of hand transferring.

This machine was followed by various important attachments applicable to all their models. These were as follows:

Crowfoot attachment for inserting a mock seam in the ankle and foot of the stocking.

Split foot attachment by which the sole of the stocking may be of a different yarn from the instep. This is done while the machine is rotating, so that there is no loss of production. These stockings may be made with a high spliced heel and plated with silk if desired.

Thread cutter by which the high spliced heel and double sole float thread is automatically cut out, which results in a large saving of expensive yarn otherwise wasted.



NEW "MODEL K" MACHINE

Striping attachment adapted to make all kinds of stockings with three color stripes.

Lace front attachment for making stockings with lace stitches in the front of the leg and instep.

All around lace attachment for making lace stitches all around the leg when desired and in the instep, but leaving the back of the ankle and the sole plain.

Tipping attachment for tipping a portion of the heels and toes with different kind or color of yarn from the rest of the heel and toe.

Devices for automatically preparing the machine for transfer: By this is meant devices for use on machines employing the hand transfer method by which the needles are leveled automatically and the latch ring is automatically raised and lowered so that the moves necessary by the operator are reduced to a minimum. With these needle leveling devices, which are covered by patent, owned by Standard Machine Company, under which Scott & Williams, Inc., are licensed, all that the operator has to do is to place the point ring on the needles, remove it again, and start the machine, reducing the time of transferring to about six seconds, greatly increasing the production of the machine.

NEW "MODEL K" MACHINE

In addition to the above improvements, Scott & Williams, Inc., brought out a new machine for women's hose for making a "fashioned welt" which they designate as their "Model K." This machine produces women's hose with an inturned knitted welt, similar to that produced on full fashioned machines It has all the features of the other models, each stocking being dropped from the machine complete, except for the looping of the toe. It is fitted with five yarn changing fingers, inserts an "anti-run-back" course, and, the welt being knitted on the machine, has all the elasticity of the fabric, and may be made as wide as desired.

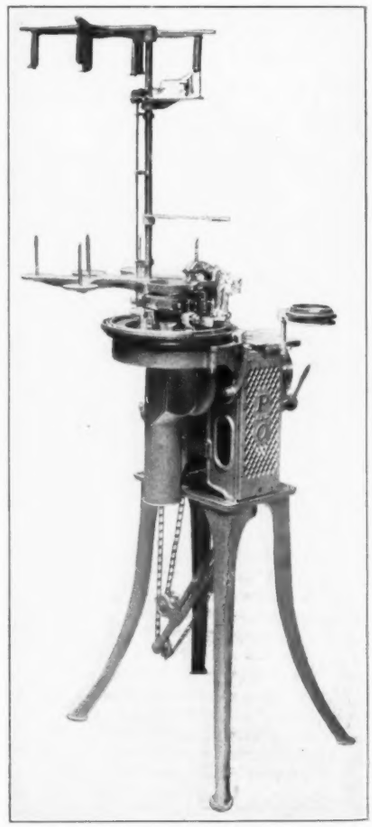
Consequently, this machine not only makes a perfect seamless stocking for women, but produces this stocking at a greatly reduced cost. The machine is very simple in its construction, and functions so satisfactorily that it may be operated with no more difficulty than the ordinary plain machine of the revolving cylinder type.

While this is a new model of machine, it has been designated by Scott & Williams, Inc., in accordance with the "Universal" principle, upon which all of their machines are constructed. By this is meant that any model of the same diameter and the same number of needles may be changed to any other model. Scott & Williams, Inc., have been most successful with this method, since one of the things that has been most costly to the knitting mills in the past has been that the development of new and improved knitting machines has made it necessary for them to discard machinery that was perfectly serviceable, but which had become out of date in that it would not produce the merchandize which the market demanded:

Since Scott & Williams, Inc., established this "Universal" principle in their knitting machines, a mill operating machinery of this type is entirely independent of market changes, as the machines may, from time to time, be altered as the demand for goods made on new and improved types of machinery arises.

NEW HOSIERY MACHINE

An important new machinery development in the hosiery field is the revolving cylinder hosiery machine manufactured by Paxton & O'Neill, of Philadelphia. The new machine will make either ladies' hosiery or half-hose, and it is a five-fingered yarn changing and plating machine. These yarn-changer fingers are continually and completely outside the path of the needles, with the result that they cannot come into contact with the needles, even when in the raised position of making heel and toe.



NEW HOSIERY MACHINE

This is a decided advantage, as it prevents the breakage of needles. A striping attachment can readily be adjusted to the machine which will make stripes in three distinct colors if desired in any

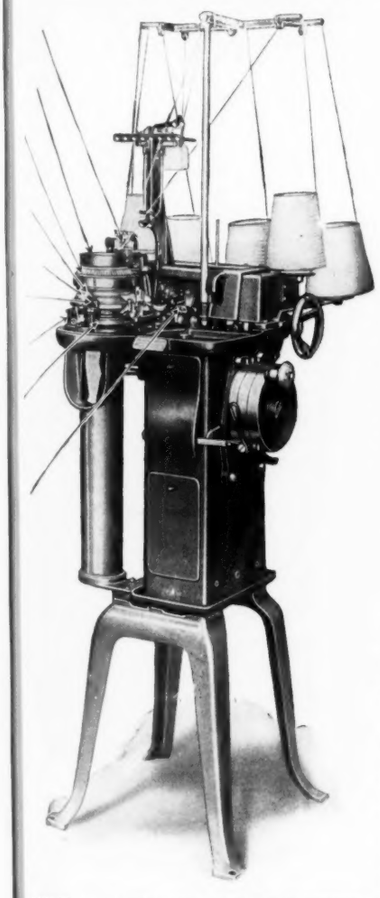
width or in any part of the stocking.

SMOOTH OPERATION

The main drive consists of a simple mechanical movement with an entire absence of complicated gearing. Every part is perfectly accessible for instant adjustment. The machine may be operated at high speed and has an easy action while operating on heel and toe, while in accordance with the usual type of Paxton & O'Neill machine, it also offers the ease and smoothness of operation due to the high character of its mechanical construction, with a resulting fine quality of goods produced. The well known easy angle of the pickers of the Paxton & O'Neill machines are also used, with the smooth rocking sinkers also identical with this make of machine. The machine is well adapted for fine gauge silk goods.

AUTOMATIC HOSIERY MACHINE

Several important improvements have been made during the year by the H. Brinton Co., builders of automatic seamless and ribbed knitting machinery, 213 Race St., Philadelphia, Pa. A new automatic hosiery knitter of the revolving cylinder type, known as the "Model C" is being offered to the trade, which



MODEL C. AUTOMATIC HOSIERY MACHINE

has five yarn changer fingers and possesses a number of features not found in other makes. It has non-friction needles and rocking sinkers, a combination producing the finest quality of fabric. There is a screw adjustment on every adjustable part, so that all adjustments are positive, all guesswork being eliminated. The machine can be run at a very high rate of speed, and gives a large output. The transferring is simple and convenient, very few hand operations being required. The machine has a great range of stitch adjustment, so that the foot and ankle of ladies' hose can be knit as tight as desired, and the top exceptionally loose.

FRENCH WELT RIBBER

They have also brought out a French welt ribber and a dogless dial attachment for ribbers. The French welt ribber has two feeds and is equipped with the two-speed drive. It is simple in construction, only a few extra parts being required. The tubular welt produced by this machine is different from the French welt produced on any other make. The end of the yarn which is left after separating the tops on the French welt ribber is tied in, so that if it is pulled the welt will not open, the same as on the old style of French welt.

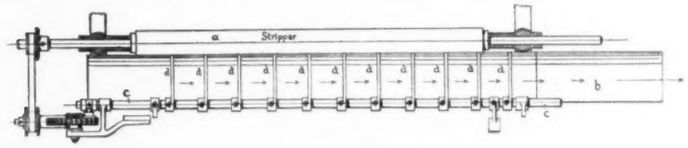
The dogless dial attachment has all the advantages of machines of this type and in addition the construction contains many good features. The main support of the dogless attachment has a three-point bearing, the three legs of the spider resting on three posts which are fastened on the bed of the machine. The stop motion or yarn stand of the machine is fastened securely to the yoke or crossbar, and has no connection whatever with the dial shaft, so that any difference in the weight of the bobbins will not affect the working of the machine. Any parts that wear out or break on this attachment can easily be replaced without replacing the main parts of the attachment.

They also have made a number of minor improvements on their machines within the past year and employ a corps of designers insuring continued progress.

PATENT CARD CLEANER

The elimination of foreign matter from wool, cotton, or other textile fibres has always been a problem. These impurities not only cause unevenness of the roving, and trouble on the mule or frame, but their presence in the yarn results in a chain of inconveniences, loss of time, breakage, etc., on looms and knitting machines.

It is a well known fact that the first and second strippers of the cards throw out a large amount of shives, etc., which drop on the rollers below, and pass through the machines, or else remain in the card clothing, thus injuring the quality of the web, and consequently the quality of the roving and yarn. Many carders use sheet iron pans to catch the waste which from time to time has to be removed by hand. This necessitates the utmost care and attention on the part of the help, as otherwise lumps may be caught by the strippers, and damage inflicted to both web and card clothing.



PATENT CARD CLEANER

Messrs. G. Josephy's Erben are building a device which not only catches the foreign matter, but removes same automatically and without necessitating the least amount of attention.

This so-called card cleaner consists of a sheet iron pan *b*, which is attached to the stripper *a*. It serves the purpose of separating from the stock the larger part of the impurities loosened by the breast and feed rollers, and removing them.

The shaft *c* carries a number of shovels *d*, which are about 4 inches apart. The shovels rest on the bottom of the pan *b* and travel in this position about 5 inches toward the open end of the pan, thus gradually removing the waste and dropping it into the waste box. At the end of their 5 inch trip, the shovels are lifted from the pan and returned to their starting point, where they again are lowered into the pan, and resume their work. The motion of traveling, lifting, and reversing is performed fast enough to prevent the gathering of any considerable amount of waste which might injure the work of the cards. The card cleaner can easily be attached to any system of carding machines, and its efficiency and stability have secured it many friends among the mill men all over the world.

NOW MADE IN U. S. A.

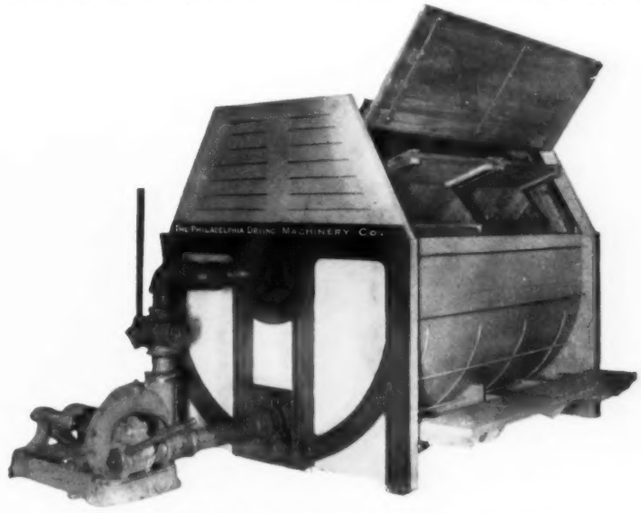
Josephy's patent card cleaner is now being built in this country by The Lehnert Textile Company, 184 Summer St., Boston, Mass., who are the representatives of Messrs. G. Josephy's Erben. The American made products which are being distributed by The Lehnert Textile Company are of the same high class workmanship for which the factory of G. Josephy's Erben is well-known.

"HURRICANE" ROTARY-CIRCULATING DYEING AND BLEACHING MACHINE

The new improved "Hurricane" rotary-circulating dyeing and bleaching machine, developed by The Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa., during the past year, for hosiery and raw stock has aroused great interest. Heretofore both the rotary and circulating types of dyeing machines have been used with considerable success, but the present machine is unique in that it possesses the good features of both the rotary and circulating types, without objectionable features.

The inner cylinder is slowly revolved first in one direction and then in the other, while at the same time the goods contained in the various pockets of the cylinder are continually subjected to a positive circulation of the liquor by means of a centrifugal pump. A large perforated pipe extends through the centre of the inside cylinder and serves for both the axis of this cylinder and the discharge for the pump. Another large perforated pipe extends along the entire length of the bottom of the tub and connects with the suction side of the circulating pump. The direction of circulation is therefore from the central pipe outward in all directions through the goods contained in the pockets.

The centrifugal pump is of ample size and so proportioned as to recirculate the entire volume of liquor about once every two minutes. This positive circulation insures thorough penetration and absolutely uniform results. The short, concentrated bath is of great advantage from the standpoint of quicker dyeing, cost of dyeing, power and steam. When used for bleaching, the machine has the same advantages, and similar economies are secured.



ROTARY-CIRCULATING DYEING AND BLEACHING MACHINE

The operation of the machine is extremely simple. The loading and unloading of the goods may be accomplished at the same time, so that a considerable saving in time is accomplished. The same pump which is used for recirculating the liquor when dyeing, bleaching or after treating is used to draw the liquor into the machine from the storage tank. In the same way, the liquor is drawn back into the tank by the pump. A simple combination of valves is all that is required for the operator to accomplish these various operations.

The goods do not roll or become tangled because of the special construction of the pockets. All operations are carried on in one machine without any further handling. The absence of handling and freedom from tangling or roughing up, make it possible to dye or bleach even the finest grades of silks, cotton or artificial silk hosiery without the use of dye bags. Furthermore, goods handled in this latest improved machine have a soft finish and better appearance.

These machines are built in various standard sizes, with cylinders made of wood, iron, bronze or special metals, according to requirements.

Recent installations have been made at the following mills:

Aycock Hosiery Mills, South Pittsburg, Tenn.; William F. Taubel, Inc., Riverside, N. J.; Chipman Knitting Mills, Easton, Pa.; Henry Taubel & Son, Riverside, N. J.; Thomas W. Buck, Hosiery Mills, Philadelphia, Pa.; Sulloway Mills, Franklin, N. H.

DEVICE FOR CARD FLATS

It is well known by every practical mill man that there comes a time when the chains carrying the top flats on cards get so badly worn that the flats

in leaving the bends come in contact with the stripping plate, and also fall away from the discs, allowing the top flat stripping comb to strike, thus dulling the wire on the flats and resulting in poor carding.

In trying to overcome these difficulties the usual adjustments are made to tighten the chains and when the limit of this adjustment is reached one or more flats may be taken out. But this tightening of the chains only increases the tension and causes them to wear still more rapidly until the distance between centers of the lugs on the flats is greater than the pitch of the sprockets driving them and new chains would be required to bring the flats back in proper position in relation to the discs.

A device is offered by Morton & Andrews of Lowell, Mass., whereby a permanent repair is made, allowing the continued use of the chains, and which completely overcomes the above troubles at a cost very much less than that incident to their renewal.

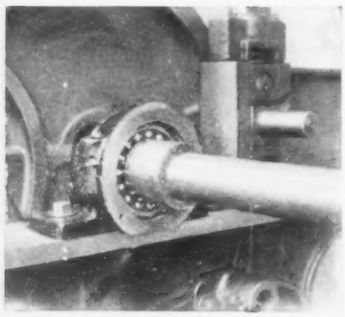
The principle involved is in having the teeth of the sprockets contact with the lugs on the flats only at the top of the discs, thus keeping the chains in tension around the discs, thereby making it mechanically impossible for the wire on the flats to strike the stripping plate when leaving the bends, keeping the flats tight on the discs so that the correct adjustment of the stripping comb with relation to the flats is always maintained and preventing it from injuring the wire.

This device is easily applied in the mill, and is giving entire satisfaction on several hundred cards on which it is already in use.

DEVELOPMENT OF BALLBEARING APPLICATIONS TO TEXTILE INDUSTRY

Ballbearing applications to textile machinery are increasing each year, and 1915 marks the successful development of the ballbearing twister spindle as made by Fales & Jenks, of Pawtucket, R. I. These spindles are made in sizes from 1¼ to 4½ inches whorl, for both belt and tape-driven spindles.

Ballbearings have also been successfully applied to cotton pickers on the main cylinder and fan shafts of machines manufactured by Saco-Lowell

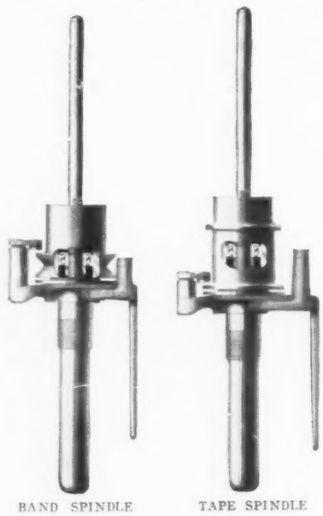


POTTER & JOHNSTON BALLBEARING BEATER BOX

Shops, Lowell, Mass.; H. & B. American Machine Co., Pawtucket, R. I.; Potter & Johnston Machine Co., Pawtucket, R. I.; Whitin Machine Works, Whitinsville, Mass., and Hubbard Machine Co., Worcester, Mass.

Another ballbearing application developed during this year is their use on cotton fans, as made by the B. F. Sturtevant Co., of Hyde Park, Mass. These fans include their cotton exhausters and volume fans. These three developments have been made carefully and after long experimentation on the part of the manufacturers before they have put them on the market.

In each of these cases the ballbearing used is the SKF self-aligning ballbearing, manufactured by the SKF Ballbearing Co., 50 Church St., New York. These ballbearings are particularly adapted to the textile industry, the construction being such that the shaft



BAND SPINDLE TAPE SPINDLE

COTTON TWISTER SPINDLES MADE BY FALES & JENKS MANUFACTURING CO.

or spindle upon which the bearings are mounted, can deflect without binding the ballbearings. These ballbearings are of the double row construction, the balls and races being made of Swedish crucible steel.

BANNER KNITTING MACHINE IMPROVEMENTS

Good progress has been made during the year by the Hemphill Mfg. Co., Pawtucket, R. I., in developing many important improvements to the Banner full automatic hosiery machine, which is their latest production. Efforts are constantly made to reach the highest possible quality of production, simplicity of construction and to provide practical attachments for effects called for by the trade. The new extra fine gauge models, a 260-needle machine with a 3¾-inch cylinder adapted for either ladies' hosiery or half hose, and a 280-needle, 3½-inch diameter model for making high grade seamless stockings, have been brought out. The style tendency toward striped hosiery was anticipated. Both the 260 and 280-needle Banner machines were given exhaustive tests in actual mill work and several refinements of construction introduced before formally offered to the trade.

The new striping full automatic Banner machine is as simple in construction as it is in operation. It is built into the machine on the cam shaft, and is operated by an independent gear from the main shaft, and can be quickly set to make any number and width of stripes with any desired spacing, and can be given any number of yarn changes with which the machine is equipped. Justifiable pride is taken in the great number of Banner machines that have been sold, over 23,000 being in successful operation in American mills.

AUTOMATIC BOARDING, DRYING AND STRIPPING MACHINE

Several new features have been added to the Proctor automatic boarding, drying and stripping machine for hosiery, which was recently put on the market by the Philadelphia Textile Machinery Co., Philadelphia. One of these new features is the improved holding-down device to prevent the stockings from slipping while drying. This device is made of wire screen, which allows the tops of the stockings to dry and presses them at the same time.

This machine makes it possible for one man to board twice as many stockings as can be handled by the old method. Boarding stockings by the old method requires fourteen operations, whereas the work can be done on the Proctor machine with only two operations, the machine doing the rest of the work. All the man has to do is to pick up the stocking and put it on the board. The machine takes the stocking to the dryer, it dries it, removes it from the dryer and from the board, piles and counts the stockings in dozens, and then carries the empty board back to the man, who puts another stocking on it. As a result, half of the time ordinarily required is saved. A stop watch test shows that half of the operator's time by the old method is taken up by operations which are eliminated by the Proctor machine.

This automatic boarding, drying and stripping machine is now built in two types, one for ladies' hose and one for half hose, and the work turned out by each machine is equally satisfactory. The machines are drying anywhere from 50 to 250 dozen pairs per day.

NEW SCOURING MACHINE

A new scouring machine is being put on the market by the Klauder-Weldon Dyeing Machine Company of Amsterdam, N. Y., and Huddersfield, England, which is meeting with high favor in the trade. It is constructed on the well-known principle of conveying the yarn through the bath by means of double aprons. Heretofore the serious objections to this type of machine was the amount of floor space required, the frequent need of repairs, and the difficulty, on account of the inaccessibility of the parts, of making repairs.

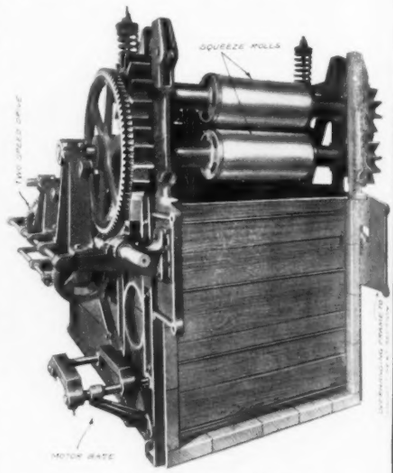
In the new machine an established and proven method of carrying the yarn is used; the floor space has been reduced over one-half; greater cleansing efficiency has been obtained by the use of oscillating carrier frames; all parts are made readily accessible by utilizing a hoist to lift the self-contained conveyor system out of the vat and it is easily replaced since the anchor boxes locate and hold it in position; the production has been increased, and the delivery of from 12,000 pounds up per day is assured, according to the condition of the yarn.

In testing the conveyor the bundles were increased from five to ten skeins to the bundle and they were handled with equal facility since the tension of the conveying aprons is regulated by heavy springs which insures perfect clamping of the yarn and eliminates any tendency to roll or tangle.

Using the junction roll feature reduces the floor space occupied as it permits of building the courses of carrying aprons one above the other rather than carrying it out horizontally in one long course. A material advantage of this construction is that the yarn is carried directly to the bottom of the vat from where it ascends, by successive stages during the washing process, throwing off the dirt and sediment as it approaches the final squeezing before passing to the next vat and during which time it is subjected to the travel and treatment described in explaining the operation.

The Klauder-Weldon aprons are made from chain with a round boss on the inner side of each link. These bosses are drilled to form cups or sockets into which the ends of the round cold rolled steel rods or cross bars are inserted. Rivets through the lugs and ends of the bars secure them in place and eliminate any chance of the chain spreading or otherwise getting out of alignment. Aprons made in this way are considerably greater than those made by riveting the bars to the chain.

The drive of this machine is of the enclosed type having two speeds, which enables the user to take advantage of different conditions of the stock. It is adapted for pulley, sprocket or direct-connected motor drive, and the machine is equipped throughout with guards, automatic stops and safety devices to prevent accidents to the operator.



NEW KLAUBER-WELDON MACHINE

The yarn is placed on the feed table "A" where it is engaged between the two conveyor aprons and is carried directly to the bottom of the vat and being squeezed as it passes around the center "B" it continues around the oscillating center "C." The frames of centers "C" and "F" are pivoted at 3 and 4 and they oscillate with a gentle swinging movement, in which one frame raises while the other is lowered and vice versa, which casts off the dirt and sediment that has been loosened and in addition keeps the bath thoroughly mixed.

From "C" the yarn passes on to "D" where it leaves the inner apron and is carried between the junction roll and outer apron at "E" where, since the yarn has now been sufficiently soaked,

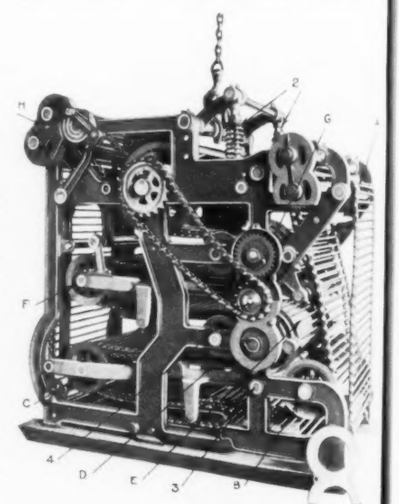


DIAGRAM OF NEW MACHINE

it receives the first heavy squeeze under the liquor (the pressure here is regulated by springs at 2) and is again taken up by the aprons and carried through "F" and "G," where the washing movement and squeezing operations are repeated, and then on through the large squeeze rolls at "H" and into the next section.

MILL CONSTRUCTION DETAILS

(*Continued from page 257*)

treas. and buyer; William G. Broadfoot, agt., supt., and buyer; Double Carded Knitting Yarns, 24s to 30s; 12,000 spindles; dye (raw stock); electric; Johnston Mfg. Co., selling agts. (Building new mill, 2 and 3 stories high, 210 by 106 feet; begin manufacturing May, 1916.)

Gastonia. Rex Spinning Co.; $500,000; J. M. Mayes, pres.; W. M. Boyce, treas. and buyer; C. M. Dunn, mgr.; Combed Yarns, 10s to 100s; 12,288 spindles; electric; sell direct. (Built new mill; expect to begin manufacturing January, 1916.)

Granite Falls. Falls Mfg. Company; $200,000 (authorized); J. D. Elliott, pres.; D. H. Warlick, treas. and buyer; Combed Hosiery Yarns; 5,000 spindles; steam. (Building new mill, expect to begin manufacturing next spring.)

Greensboro. Revolution Cotton Mills; Colored and Bleached Flannels; built new yarn mill and new weave shed; 40,000 spindles; 1,132 looms.

Hickory. Highland Cordage Co.; $125,000; Chas. H. Geitner, pres.; A. A. Shuford, Jr., treas.; cotton cordage.

Winston-Salem. Hanes, P. H., Knitting Co.; Mill No. 4; 8s to 24s Yarns; 7,500 spindles.

Pennsylvania, Philadelphia. Derk, Joseph & Co.; Berkeley and Wayne Aves.; $10,000; Jos. Derk, pres.; Jonathan W. Barber, treas. and buyer; Upholstery Fabrics; 10 looms; steam; sell direct; buy 20/1 to 80/2 cotton yarns; all kinds of filling.

Bristol. Bristol Mfg. Co.; installing 40 looms in building at foot of Pond Street to manufacture Turkish Towels and Terry Fabrics; a branch of So. Langhorne plant of Frederick Rumpf's Sons.

Carlisle. Todd, R. K.; Roger Todd, supt.; Cotton and Union Huck Towels; electric; sell direct. (Will add bleaching and finishing dept. and erect addition for this purpose later.)

Rhode Island, Pawtucket. National Webbing Company; Broad Street; $25,000; E. J. Cunningham, supt. and buyer; Elastic and Non-Elastic Webbings; 18 looms; electric; sell direct.

South Carolina, Great Falls. Republic Cotton Mills; Print Cloths; increased capital stock from $600,000 to $1,200,000; building new 40,000-spindle mill, and will install 1,000 looms to be driven by electric power.

Tennessee, Shelbyville. Shelbyville Cotton Mills; $100,000; William J. McGill; Hosiery Yarns; 4224 spindles.

Canada, Ontario, London. Middlesex Mills, Ltd.; $80,000; Albert Mitchell, pres., mgr., and buyer; C. A. Butterworth, treas.; Quilts, Towels, and Novelty Fabrics; 48 looms; office, 202 Dominion Savings Bldg., London, Ont. (Will not manufacture for several months.)

NEW WOOLEN MILLS

California, Long Beach. Golden State Woolen Mills. W. Jowett, supt. and buyer; Flannels, Cassimeres and Blankets; 3 sets; 30 looms; dye and finish; electric.

Georgia, Augusta. Lee, Wm. & Co.; Press Cloth; 1 set drawing and spinning and 1 loom.

Massachusetts, Hudson. Byron Wool Stock Co.; River St.; $5,000; James F. Byron, mgr.; Picking, Garnetting Wool Waste or Silk, on commission; 4 pickers; 4 garnetts; 1 lumper; will add more machinery.

Millville. Carroll Bros.; S. A. Carroll, pres. and buyer; Shoddy. (Erected new mill, 100 by 50 feet.)

Somerset. Somerset Mat & Rug Co., $50,000; R. T. Fletcher, Boston, pres.; M. Scullar, treas.; and Geo. M. Faulkner.

Worcester. Bell Company; 54 Commercial Street; $25,000; Merle Bell, treas. and buyer; Custom Weaving; electric.

New Hampshire, Claremont. Claremont Waste Mfg. Co.; $25,000; A. C. Bowman, pres.; Samuel Steinfield, treas.; Frank Steinfield, sec.; Waste, Flocks and Other Wool Products.

New Jersey, Camden. United States Wool Combing Company; 9th and State Streets; $125,000; F. H. Middlebrook, pres.; J. A. Bottomley, treas.; Commission Wool Scouring and Combing; 2 scouring machines; 18 cards; 16 combs; dye; steam; sell direct.

New York, Rensselaer. Barnet, William & Son; Wool Shoddies; built new mill, 3 stories, 351 by 60 feet, to replace burned plant.

Pennsylvania, Philadelphia. Acme Press Cloth Co.; Tacony St. and P. R. R., Frankford; Camel's Hair, Wool and Cotton Press Cloths; steam; sell direct.

Philadelphia. Emery, Jere; 1645 N. 10th St.; Worsted Fabrics; 8 looms.

Philadelphia. Frankford Worsted Co.; D. Satinsky, prop.; rear 4155 Frankford Ave.; Frankford; Dress Goods and Men's Wear Worsteds; 4 looms; steam; sell direct; office, 2843 Frankford Ave.

Philadelphia. Lincoln Worsted Mills; Hope St., above Lehigh Ave.; Men's Wear and Shoe Topping; 30 looms.

Philadelphia. Pero, A. J.; 1543 Ruan St., Frankford; Woolen and Worsted Fabrics on commission basis; 20 looms.

Espy. Riverdale Worsted Mills; $10,000; Thomas Williams, pres., agt., and buyer; C. B. Stauffer, treas.; Worsted and Artificial Silk Yarns for Weaving and Knitting; 1s to 2/40s; 2,000 worsted spindles; 1 comb; electric; sell direct.

Kutztown. Fincus, Harral & DeLong; Rugs; 15 looms; will install more looms.

Lansdale. Newark Hair Felt Co.; $40,000; C. Cole, pres.; M. J. Murphy, treas.; Hair Felts for Electric and Upholstery Trades; 2 pickers; 2 cards; steam; sell direct; M. J. Murphy, buyer.

Norristown. Fahy, B., 512 Green St.; Colonial Rugs and Carpets; 12 looms; sell direct.

Rhode Island, Woonsocket. Uxbridge Worsted Company; Glenark Plant; H. William Maertens, agt.; 1,200 worsted spindles; 48 looms; (Bradford) (Branch of Uxbridge, Mass.)

Canada, Ontario, Milton. Milton Textiles, Ltd.; $100,000; H. C. Secord, pres.; W. F. Jones, treas.; Robt. Gaunt, supt.; Upholstery Goods, Velours, Plushes, Curtains, Mohair and Silks; 24 looms; piece-dyeing, steam and electric; sell direct.

Ontario, Toronto. Lalor, John M.; 414-20 Eastern Ave.; John M. Lalor, buyer; Shoddy of Wool and Cotton Mattress Felts, etc.; sell direct.

NEW KNITTING MILLS

California, Los Angeles. Myers Mfg. Co.; 258 So. Los Angeles St.; E. B. Myers, pres.; Benj. D. Potter, supt.; Knit Bathing Suits and Jerseys; 3 knitting and 3 sewing machines; electric; sell direct.

San Diego. San Diego Knitting Mills; 942 Broadway; Mrs. T. R. Wittenhoefer, mgr.; Sweaters, Jerseys and Bathing Suits.

Connecticut, New Haven. Elm City Knitting Company; 31 Crown St.; Misses' Sweaters, Toques, Hockeys; 8 knitting and 4 sewing machines; sell jobbers; New York office, 132 Bleecker St.

Florida, Ocala. Ocala Knitting & Mfg. Co.; $50,000; Geo. Giles, pres.; J. S. La Roche, treas.; H. F. Booth, supt. and buyer; Men's, Women's and Children's Knitted Underwear; electric.

Georgia, Athens. Holland Mfg. Co.; Broad St.; $100,000; W. C. Wilson, pres.; S. C. Candler, treas. and buyer; T. W. Woodham, supt.; Ladies' and Men's Hosiery; 25 knitting and 2 sewing machines; dye, steam and water; sell direct.

Gainesville. Merck-Hetrick Mfg. Co., $10,000; H. H. Merck, pres. and treas.; W. F. Hetrick, supt. and buyer; Men's and Women's Hosiery; 50 knitting and 2 sewing machines; steam and electric; dye piece; Hinchman, Vezin & Co., selling agents.

Illinois, Chicago. Felton, Chas. L. 711 Vedder St.; Silk Sweater Coats.

Chicago. Klein, Brady, Friedlander, Inc.; 2901 Indiana Ave.; $25,000; William L. Klein, pres. and buyer; Hugo Brady, treas.; Knit Gloves; Mittens, Jersey Gloves; all direct.

Dixon. Pyrography Art Co., Inc.; Men's Hosiery; 84 and 108 needle; 30 knitting machines.

Kentucky, Lookout. John D. Coleman; Hosiery and Gloves; capacity 50 pairs daily.

Maryland, Frostburg. D. M. Mullin; 215 Welsh Hill; Woolen Hosiery; 7 knitting machines; 1 ribber; 1 looper; Darn-No-More Hosiery Co., Chicago, selling agts.

Massachusetts, Boston. Globe Knitting Co.; 386 Harrison Ave.; David M. Gold, pres.; William Sedlis, treas.; Joseph L. Rogers, Clerk; Sweaters; 25 knitting and 20 sewing machines.

Hudson, Shetland Knitting Mills, Inc.; 8 Houghton Street; $8,000; Albert B. Freeman, pres.; Harry C. Beiess, treas. and buyer; Infants' and Children's Worsted Knit Goods; 4 knitting machines; electric; sell direct.

Lowell. Walters Knitting Co.; W. E. Kehew, prop.; 72 Sparks St.; Men's High Grade Mercerized Hosiery; electric; sell direct.

Michigan, Grand Haven. Amazon Knitting Co.; Women's and Children's Underwear and Children's Waists; building new 1-story mill; 60 by 180 feet (Branch of Muskegon, Mich.).

Laurium. Stiglich Knitting Mills; Stephen Stiglich; Men's, Women's and Children's Hosiery; will install 10 knitting machines, 3 ribbers, 7 knitters, 3 loopers. (Begin manufacturing about Jan. 1, 1916.)

Norway. Erickson, H.; Sweaters and Various small knitted articles.

Ypsilanti. Consolidated Hosiery & Novelty Co.; 603 Michigan Ave.; $25,000; B. S. Boyce, agt. and buyer; Hosiery for Men and Women, and Knitted Garments for Men, Women and Children; 12 knitting and 40 sewing machines; electric; sell direct.

Minnesota, Duluth. Bullard Knitting Co.; 511 E. 4th Street; Sweaters, and Caps; 3 knitting and 7 sewing machines; electric; sell direct.

Duluth. West Duluth Knitting Mill Company; 49th Ave., W., and Oneto St.; J. A. Leidfors, Olaf Bertilson, George Bertilson, and P. G. Borgstrom interested; Sweaters and Hosiery.

Rushford. Root River Knitting Factory; All Wool Seamless Hosiery; 15 knitting machines; steam and gasoline; sell direct.

New Jersey, Camden. Camden Knitting Mills; James Firth, prop.; 2101 Broadway; Sweater Coats, Bathing Suits; etc.; 6 knitting and 3 sewing machines; electric; sell direct.

Camden. Taubel, William F., Inc.; Hosiery. (Branch of Riverside, N. J.)

Millville. Taubel, William F., Inc.; Hosiery; electric. (Branch of Riverside, N. J.)

Newark. Comfort Knitting Mills; 391 Lafayette St.; Felix Strobel, buyer; Full Fashioned Sweater Coats, Caps, Scarfs, Bathing Suits, and Knit Goods; 12 knitting and 2 sewing machines; sell direct. (Formerly operated by Charles Beyer.)

Morristown. Goodman Bros.; will erect new 2-story underwear mill to cost $6,200; space has been leased for the present until the new building is completed in about two months.

Passaic. Guenther, Paul; Van Houten Ave.; Men's and Women's Full Fashioned Silk Hosiery.

Paterson. Rains, Sol. B.; 60 Front St.; Jersey Cloth, Silk Nets and Ladies' Underwear; 7 knitting frames.

Trenton. Taubel, Wm. F., Inc.; Hosiery. (Branch of Riverside, N. J.)

Vineland. Taubel, Wm. F., Inc.; Hosiery. (Branch of Riverside, N. J.)

New York, Brooklyn. Bonnard Specialty Co., 112 Berriman St.; $25,000; G. M. C. Bonnard, pres., treas., supt., and buyer; Knitted and Woven Goods, Angora and Novelty Cloth; 10 knitting and 8 sewing machines.

Brooklyn. Oriental Knitting Mills, 277 20th St.; Sweaters, Caps and Sashes.

Brooklyn. Shirley Knitting Mills, Inc.; 814 Gates Ave.; A. J. Greenhill, supt. and buyer; Sweater Coats, Bathing Suits, etc.; 10 knitting and 6 sewing machines; sell jobbers.

Buffalo. Kromer & Griffin; Silk Jersey Cloth, Underwear and other Silk Products.

Canandaigua. Roper Knitting Co., Inc.; $15,000; George Roper, pres. and buyer; A. C. Clark, treas.; Men's, Women's, and Children's Sweaters and Fancy Knit Goods; electric; sell direct.

Cuba. Cuba Knitting Mills; W. G. Johnson, supt. and buyer; Ladies' and Men's Hose; 14 knitting and 2 sewing machines; gas; sell direct.

Ellicottville. Lander & Watson Hosiery Co.; Artificial Silk Split Foot Hosiery for Men and Women. (Removed here from Perry, N. Y., and built new 2-story brick mill and added new knitting equipment.)

Gloversville. United States Silk Company; $30,000; M. C. Dennie, pres., supt. and buyer; Hugh McDonald, treas.; Silk Jersey Cloth and Nettings; 2 knitting frames. (Built new 2-story mill, 35 by 70 feet.)

Medford. Medford Knitting Mills, Inc.; $15,000; Sweaters.

New York City. Alvin Knitting Mills; 49 E. 21st St.; Silk Sweaters; 3 knitting machines; A. Schwartz, buyer.

New York City. Bruck Knitting Mills, Inc.; 13-15 E. 22nd St.; Joseph Orthof, pres. and buyer; Sweaters, Sweater Coats, Infants' Goods, Fancy Knit Goods; 45 knitting and 18 sewing machines.

New York City. Emerald Hosiery Mills, Inc., 4285 Park Ave.; $80,000; Thos. O'Callaghan, pres.; Henry W. Fedden, treas.; George Fedden, supt. and buyer; Full Fashioned Cotton, Lisle and Silk Hosiery; electric; O'Callaghan & Fedden, selling agts.

New York City. Goldstein, H. & Bro.; 18 Orchard St.; 84-needle Hosiery.

New York City. Palm Knitting Co., Inc.; 8 W. 71st St.; Silk Sweaters, Neckwear, Mufflers, and Silk Novelties; 12 knitting and 3 sewing machines; buy silk, tussah, art. silk, woolen and worsted yarns.

Northville. "La Belle" American Silk Mills, Inc.; $125,000; L. E. Winnie, pres., agt., supt. and buyer; John A. Williard, treas.; Tricot and Milanese Silk Jersey Cloth for Gloves, Underwear, etc., Veils and Veiling; Chamoisette Cloth for Gloves; 2 knitting frames; 80 spindles; sell direct.

Palatine Bridge. Underwood Silk Fabric Co.; $20,000; Henry Underwood, pres., supt. and buyer; Geo. Flume, vice-pres.; Lauren Borst, treas.; Silk Fabrics, Nets; 120 spindles; 3 looms; electric; H. H. Thompson & Co., selling agts.

Sidney. Jersey Silk Mfg. Company, Inc.; $7,500; Wm. Wuerdeman, pres. and mgr.; V. D. Stratton, treas.; Silk Fabrics, Jersey Silks, Silk Nets, etc.; electric.

Stapleton. Stapleton Knitting Mills; I. Berman; Sweaters for men, women and children; 8 knitting and 6 sewing machines.

Utica. K-F Knitted Waist Co.; 616 Broad Street; Children's Knitted Waists and Union Suits; 6 knitting and 16 sewing machines; electric; Barnes, McGoey & Ely, N. Y., selling agts.; J. A. Firsching, buyer.

Utica. Nugent Knitting Mill, Inc.; $15,000; Thomas P. Nugent, interested.

Utica. Ross-Hogan Knitting Corp.; 411 Main St.; $10,400; Charles Ross, pres. and buyer; Morgan M. Hogan, treas. and mgr.; Boys' and Misses' Union Suits and Men's Bathing Suits; 22 knitting and 40 sewing machines; electric; buy 12s to 30s carded and combed cotton yarns, and 26s to 40s worsted; sell direct to jobbers.

North Carolina, Charlotte. Defiance Sock Mills; 144 South Boulevard; Morehead Jones, treas. and buyer; E. C. Sanders, supt.; Men's and Women's Split Foot Hosiery; 5 sewing machines; 40 knitting machines; finish, electric. (Building new plant.)

Durham. Emory, J. H.; 510 Gurley St.; Silk Hosiery.

Haw River. Childrey Hosiery Mills; W. H. Childrey, buyer; Men's Fine Gauge Mercerized and Silk Hosiery; 27 knitting machines; electric; sell direct. (Will enlarge.)

Hendersonville. Grey Hosiery Mills; building new mill to begin manufacturing in January; on Misses' seamless Cotton Hosiery, with 30 knitting machines; dyeing and finishing department, electric power; James P. Grey, Sr., and James P. Grey, Jr., interested.

Icard. Icard Mfg. Company; D. B. Mull, W. Y. Frazier; 176-needle Cotton Hosiery.

Ohio, Youngstown. Block Gas Mantle Co.; $1,000,000; Otto Kaufmann, pres. and mgr.; Edw. S. Kaufmann, supt.; Gas Mantles; 2 looms, 150 knitting and 10 sewing machines; buy cotton and ramie yarns.

Pennsylvania, Philadelphia. Alma Hosiery Mills; F. H. Seimes; 505 W. Lehigh Ave.; Women's Silk and Artificial Silk Hosiery, 12 knitting machines; electric; sell direct.

Philadelphia. Blaetz, J. H.; 167 W. Oxford St.; Children's Cotton, Silk and Mercerized Hosiery.

Philadelphia. Brown, Henry & Sons Company; Ontario & I Sts.; $200,000; Victor W. Wills, treas.; Cotton, Mercerized and Silk Hosiery and Knit Goods.

Philadelphia. Brown Phelps Hosiery Co.; 3rd and Ontario Sts.; Seamless Cotton Mercerized and Silk Hosiery for Men, Women and Children; 220 and 240-needle; 136 knitting machines; 5 sewing machines; electric; office 2nd and Westmoreland Sts.

Philadelphia. Colonial Knitting Mills, Inc.; $100,000; Harry A. Norris, M. B. Elwert and Charles Chrstos; Full Fashioned Silk Hosiery.

Philadelphia. Full Size Hosiery Co.; Brown & Vickerman, props.; N. W. Cor. 10th and Diamond Sts.; Harry Wister, Jr., supt.; Women's Seamless Cotton and Mercerized Hosiery, 176 to 208 needles; 22 knitting machines; 1 looper, 1 welter; finish; electric; sell direct; buy 20, 28 and 40 single on cones.

Philadelphia. Herbert Hosiery Mill; Leon S. Herbert; Powder Mill Road and Adams Ave., Frankford; Ladies', Children's and Infants' Fine Hosiery; 30 knitting and 4 sewing machines; steam and electric; sell jobbing trade.

Philadelphia. Lincoln Silk Knitting Mills; N. E. Kahn and J. Kenner; 44 N. 4th St.; Silk Sweater Coats; Sashes, Caps and Reefers; 14 knitting and 8 sewing machines; 3 winders; electric; sell direct; buy silk, art. silk and mercerized yarns.

Philadelphia. Nickels, Lauber & Caplan Knitting Co.; Marshall and Spring Garden Sts.; Knitted Neckwear, Reefers, Other Lines Fancy Silk Knit Goods; sell direct and through New York. (Formerly Nickels & Lauber Knitting Co.)

Philadelphia. Norma Knitting Mills; 3rd and Huntingdon Sts.; Women's Full Fashioned Silk Hosiery; 20 knitting frames; sell direct.

Philadelphia. Queen Knitting Mills; 1016 Hamilton Street; Woolen, Worsted and Silk Sweater Coats; 25 knitting and 4 sewing machines; sell direct.

Philadelphia. Schumann, A. W.; 15 Strawberry St.; Silk Knitted Neckwear; 9 knitting machines; sell direct.

Philadelphia. Smalley, Charles C.; Rhawn St., Frankford; installing from eighty to one hundred knitters to manufacture seamless hosiery in silk, art. silk and mercerized; will also install equipment for dyeing, bleaching and finishing.

Philadelphia. Susquehanna Hosiery Mills; 2720 W. Susquehanna Ave.; Full Fashioned Hosiery; Specialties in Silk, Cotton and Embroideries; 2 loopers; 2 seamers; electric; finish; sell direct; buy goods in gray.

Philadelphia. Sudowski, M. S.; rear 218 Arch St.; Coning, Spooling of Silk and Art. Silk; 2 coning machines; 2 spoolers; also operate 3 knitting looms on silk fabrics and trimmings for the sweater trade on commission.

Philadelphia. Unique Knitting Co.; 1220 N. Lawrence St.; $5,000; N. R. Kline, supt.; Infants' Seamless Cotton and Silk Hosiery; 20 knitters; 6 ribbers, 6 loopers; steam; sell direct; buy mercerized and silk yarns.

Philadelphia. Wile & Oppenheimer; 4040 Germantown Ave., Germantown; Knitted Cloth for Corset and Underwear Manufacturers; electric; sell direct; buy 2/26, 2/30 cotton and mercerized yarns.

Philadelphia. Wrights Mfg. Company; John Wright, prop.; 5129 Wakefield St., Germantown; Laundry and Dye Bags; 4 double ribbers; 2 sewing machines; steam; sell direct; buy 8/3, 8/4 and 4/4 on tubes.

Allentown. Weneck Mills; 617 Court Street; $5,000; Jos. M. Beck, pres.; Robt. A. Walp, sec.; Millie I. Dixon, treas.; Chinchillas and Knitted Fabrics; 8 heads; steam; sell direct; buy wool, mohair and cotton yarns.

Bally. Paragon Knitting Mills; Leo J. Eck, buyer; Men's and Women's Hosiery; 30 knitters; 8 ribbers, 6 loopers; steam and electric; sell direct; buy art. silk.

Boyertown. Blood, John & Co.; 7th and Somerset Sts., Phila.; established branch hosiery plant in Boyertown.

Danville. Purpur & Peckworth Knitting Co.; starting new knitting mill in building on Pine Street; Mr. Purpur, business manager; Mr. Peckworth, charge of manufacturing.

Elizabethville. Collier, Ray C.; Stocking Feet; 176-needle; 10 knitters; 1 looper; sell direct; buy 14 and 40 cotton yarns.

Hamburg. Glorie Underwear Mill; Ladies' and Children's Light and Heavy-weight Underwear and Union Suits; Plain and Fancy; cotton; 40 knitting and 60 sewing machines; steam; finish; sell jobbers; Wm. H. Shelp & Co., N. Y., sole selling agt.

Lansdale. Kriebel, Jacob T.; 131 Green St.; L. A. Kriebel, treas.; Nelson C. Kriebel, supt. and buyer; Men's Half Hose, Cotton, Mercerized, Silk and Wool; 2 knitters; 1 looper; finish; electric; sell direct; buy white and colored yarns.

Lebanon. Taubel, William F.; Hosiery; branch of Riverside, N. J.

McAdoo. McAdoo Knitting Mill; W. F. Miller, pres. and buyer; W. Russell Miller, supt.; Women's and Children's Underwear; 10 knitting and 8 sewing machines; electric; Jonas B. Robitscher, N. Y., selling agt.

McKeansburg. McKeansburg Hosiery Mill; $6,500; Half Hose; 160-needle; 62 knitting and 4 sewing machines; steam; C. A. Bolich, buyer. (Expect to install a dyeing and finishing department.)

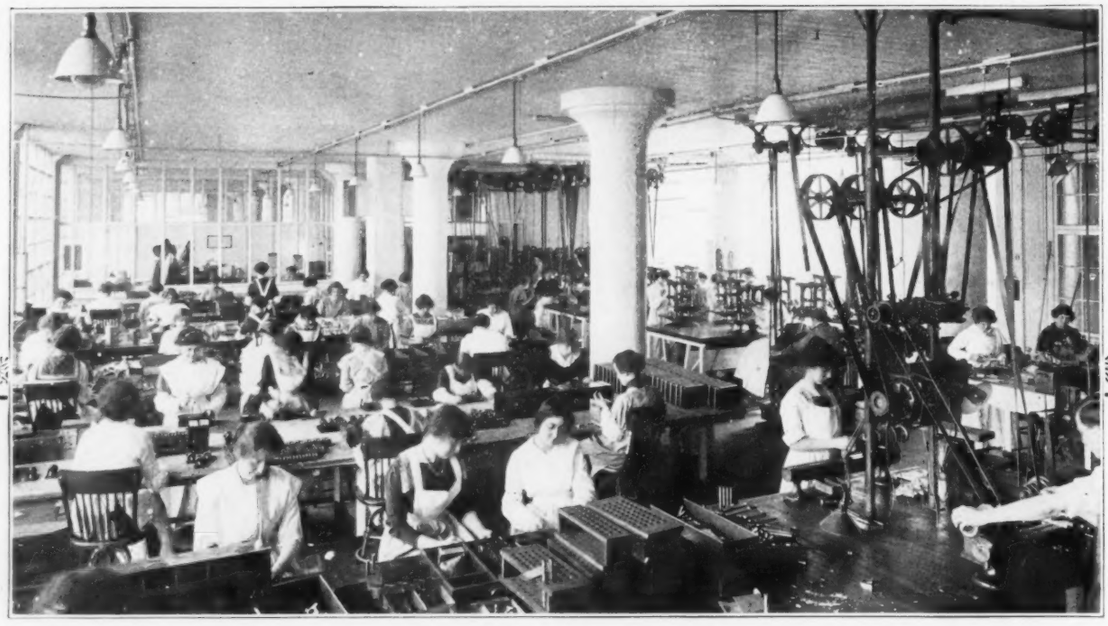
Meadville. Meadville Knitting Mills; $40,000; Hosiery; 1 set; 360 spindles; 30 knitters. (Took over Conn Woolen Mills and installed knitting machinery.)

Montoursville. Lesher, L. & Co.; L. Lesher, supt. and buyer; Half Hose, buy 9, 12 and 18s carded peeler.

Palmyra. Taubel, Wm. F., Inc.; Hosiery; building new 3-story brick plant, 50 by 119 feet; branch of Riverside, N. J.

Parkers Landing. Parker Woolen Mills; $10,000; W. S. Thompson, pres.; Arthur E. Conn, treas. and buyer; J. O. Conn, supt.; Woolen and Merino Yarns and Men's Seamless Half Hose; 1 set; 12 knitters; gas. (Added new hosiery and knitting dept.)

Phoenixville. B. B. Knitting Mills; Frank



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Boston New York Jersey City Chicago Kansas City Minneapolis Toronto

E. Bader and David Buck; Women's Union Suits; 2 sewing machines; 5 knitting machines.

Pleasant Gap. Millheim Knitting & Mfg. Company; Hosiery; 50 knitters; 6 loopers; 10 ribbers; electric. (Branch of Millheim.)

Portland. Kistler, A. W.; Children's Hosiery. (Establishing branch of East Stroudsburg.)

Quakertown. Quakerknit Knitting Mills; Paul L. Hafler, Drexel Bldg., Phila., and Lewis L. Fluck purchased 3-story brick mill, installed machinery of old Quakertown Knitting Mills, and will manufacture seamless hosiery in cotton and mercerized; installing new machinery to manufacture silk plated hosiery, and will sell direct from Philadelphia office, 35 Drexel Bldg.

Reading. Chasox Underwear Mills; $10 Windsor Street; Chas. H. Cox, buyer; Men's and Boy's Athletic Shirts; 8 cotton spindles; 5 sewing machines; 6 knitting machines.

Reading. Consumers Direct Mills; Gilbert St.; Seamless Cotton and Mercerized Hosiery and Half Hose; 3 loopers; 8 knitters; electric; sell direct; Robt. McCain, buyer; buy 1/26 to 2/60.

Reading. Taubel, William F., Inc.; 6th and Chestnut Sts.; Hosiery. (Branch of Riverside, N. J.)

Schuylkill Haven. Harner, J.; Margaretta St.; Women's Ribbed Cotton Underwear; 11 gauge; 12 sewing machines; 16 knitting machines; electric; finish. (Took over mill of A. H. Kline.)

Shillington. Hawk, George W. Co.; Fine Gauge Seamless Hosiery; built new mill to replace burned plant in Reading.

Slatedale. Slatedale Knitting Mills; Eugene F. Krum, prop.; Children's Hosiery; 10 knitters; 12 ribbers; 5 loopers; steam; buy 40/2, 30/2, 50/2, 70/2 C. P. mercerized.

Spring City. Keystone Stocking Mills; $25,000; E. C. Matlack, pres.; John Lindauer, sec.; John Scott, Jr., treas.; Seamless Cotton and Merc. Hosiery; 100 knitters; 25 loopers; electric; finish; sell direct; N. Y. office, 74 Leonard Street; buy cotton and merc. yarns.

Sunbury. Gass, I. Clyde; 521 Packer Street; Hosiery; 4 knitters; electric. (Will make changes in company and add machinery.)

Waynesboro. Waynesboro Knitting Co.; $12,500; John B. Eader, pres., treas. and buyer; Ladies' Cotton Knit Underwear; 8 knitting and 40 sewing machines; electric; sell direct; took over Waynesboro plant of J. C. Roulette & Son, Hagerstown, Md.

Rhode Island, Providence. Providence Knitting Company; D. J. Maloney, prop.; 40 Clifford St.; Bathing Suits and Jerseys; 6 knitting and 8 sewing machines; steam; A. J. Armstrong, 349 Broadway, N. Y., s. agts.; John F. Maloney, buyer; buys 2/30s, 2/18s, 2/14s worsted, single 30s worsted, and 18/1, 1/9 cotton.

South Carolina, Blacksburg. Volunteer Knitting Mills; $5,600; Chas. Baber, pres.; J. G. Sapoch, treas. and buyer; Men's and Women's Hosiery; 25 knitting machines; steam.

Tennessee, Chattanooga. Nick-a-Jack Hosiery Mills; 322 Market St.; $30,000; Chas. R. Hyde, pres.; T. Walter Fred, treas. and buyer; J. O. Dills, supt.; Men's Artificial Silk Half Hose; 10 knitting machines; electric; dye and finish; Robt. P. Steele and R. T. Edwards, selling agts.

Newport. Kyker, J. W.; Hosiery; gasoline; buy coarse yarns, white and colored; 15 knitting machines; enlarging plant.

Shelbyville. Robinson-McGill Mfg. Co.; $65,000; T. M. Robinson, pres.; W. J. McGill, treas.; L. L. Power, buyer; Men's Ribbed Union Suits; 12 knitting and 35 sewing machines; dye; electric.

Soddy. Richmond Hosiery Mills; Garnett Andrews, Chattanooga, pres. and buyer; Will Lane, supt.; Seamless Hosiery; 100 knitting machines; R. P. Steele, 346 Broadway, s. agts.; built new brick building, 100 by 50 feet, with boiler house, 40 by 18 feet; branch of Richmond Hosiery Mills, Rossville, Ga.

Washington, Seattle. Coast Knitting Co.; Seiro Shibagaki, 824 Main St.; Cotton Hosiery; dye and finish.

Seattle. Rainier Knitting Co., Inc.; $10,000; 3711 Ferdinand Street; W. P. Dehen, pres. and mgr.; Joseph Stigler, treas.; C. Dehen, sec.; Sweaters, Hosiery and Knit Goods; 3 knitting and 3 sewing machines. (Formerly Dehen & Schmitt.)

Wisconsin, Brodhead. Brodhead Knitting Company; J. C. Berryman, pres.; D. E. Hooker, treas.; George J. Schmitz, supt. and buyer; Sweaters, Underwear and Hosiery; 3 knitters; sell direct.

Canada, British Columbia, Vancouver. Selkirk Garment Co.; 976 Granville St.; Sweaters.

British Columbia, Vancouver. Universal Knitting Co.; A. C. Cohen, prop.; Sweaters and Sweater Coats for Men, Women and Children; 24 spindles; 7 sewing machines; 10 knitting machines; electric; sell direct.

Ontario, Dundas. Wright, James, Sr.; Wool Socks.

Ontario, Kincardine. Circle-Bar Knitting Co.; $50,000; Wm. Mitchell, pres. and buyer; W. G. Keebler, supt.; Cashmere, Silk and Cotton Hosiery for Men, Women and Children; steam; sell direct (built new mill).

Ontario, Toronto. Masenger, J.; 181 Williams St.; Men's Woolen Half Hose.

Ontario, Toronto. Thomson Knitting Co.; Chas. W. Adams, Supt.; W. W. Thomson, buyer; Cotton and Mercerized Hosiery for Men, Women and Children; 100 knitting and 10 sewing machines; plant at London, Ont., burned; started new plant here.

Ontario, Toronto. Wearever Hosiery Co.; 49 Bathurst St.; Men's Socks (built new mill).

Quebec, Montreal. Elite Hosiery Co.; 31 Notre Dame St.; Military Socks; 15 knitting machines; electric; F. R. Sylvester, buyer.

Quebec, Sherbrooke. Kayser, Julius & Co.; Frontenac St.; Silk Gloves. (Branch of Brooklyn, N. Y.)

NEW SILK MILLS

Connecticut, Danbury. Imperial Silk Works; Highland Ave.; $50,000; Geo. E. von Gal, pres., treas. and buyer; Mr. Gantert, supt.; Hat Bands, Braids and Cords; electric; sell direct.

New Jersey, Camden. Feather, S. & Co.; 110 Erie St.; Samuel Feather, William Aveyard; Artificial Silk Tops, Yarns for Knitting; 2 cards; 2 worsted combs; Samuel Feather, buyer; buys artificial silk waste. (Formerly at Chester, Pa.)

Paterson. Brown, Jacob P. Silk Company; 52 Garfield Ave.; $20,000; Jacob P. Brown, pres.; C. W. Weiss, sec. and treas.; Commission Winding, Warping and Entering; 9 warping machines, 11 winders and 9 enterers.

Paterson. Crystal Silk Co.; Todd Mill; $20,000; Joseph Rambam, pres.; Louis Rutkin, treas.; Broad Silks; 22 looms; sell direct.

Paterson. Eagle, J. H. & C. K., Inc.; John Bentley, manager; Taffetas and Linings; installed 80 looms in Lynch Mill for a branch plant; main mill at Shamokin, Pa.

Paterson. Lincoln Silk Company; Tie Silks; started annex plant in Van Vlanderin Mill; installed 42 broad silk looms.

Paterson. Meredith, Ernest; building new silk throwing mill on Carroll St., between Park Ave.

Paterson. Saratoga Silk Co.; Samuel Lessler; Essex Mill; Broad Silks; 20 looms.

Paterson. Willem Silk Co.; 62 Railroad Ave.; Broad Silks; 24 looms.

Tuckahoe. Eagle Broad Silk Co.; Jas. Potts, supt. and buyer; Broad Silks; 30 looms; gasoline; E. C. Rolker, 44 E. 23d St., New York, s. agts.

West Hoboken. Frueh, Walter; Monastery St. & Kerrigan Ave.; Embroideries.

New York, New York City. Kahn & Rosenthal; 36 E. 31st St.; Broad Silks.

North Carolina, Valdese. Waldensian Swiss Embroidery Co.; $27,000; W. C. Ervin, pres.; H. Clot, treas. and buyer; Embroidery of all kinds; electric; sell direct; will begin manufacturing about Jan. 1, 1916.

Pennsylvania, Philadelphia. Lyon Silk Company, The; Albert Bamber, prop.; Frankford; Com. Coners, Spoolers and Winders of Silk, also Dealers in Hosiery Clips, Odd Lots Raw and Dyed Silks of All Kinds; 2 winders; 1 coner; gas.

Philadelphia. Pacific Embroidery Co.; Wm. Schwartz, prop. and supt.; Mascher and Turner Sts.; I. Soloman, mgr.; Swiss Embroideries; 15 machines; sell direct; buy merc. yarns.

Benton. Harbred Silk Company; William J. Hartman, pres. and buyer; M. S. Bredhenner, treas.; Geo. A. Moore, supt.; Silk Throwing; 12,000 spindles. (Built new mill. Branch of Algonquin Silk Co., Shickshinny, Pa.)

Childs. Stone Silk Co.; $25,000; establishing a silk mill here; reported that men connected with Stone Coal Company interested.

Dorrancetown. Duplan Silk Company; built new silk throwing plant, including 40,000 spindles; also new steam and electric power plant to develop 1,000 h.p. (Branch of Hazleton.)

Dunmore. Cardiff Silk Throwing Co.; $25,000; Jas. J. Cardiff, pres. and buyer; P. D. Manley, treas.; Silk Throwing; electric.

Easton. Edirose Silk Co.; erecting new silk mill on N. 4th St.

Kulpmont. Eagle, J. H. & C. K., Inc.; building new broad silk mill, 5 stories, 60 by 238 feet, brick and steel; expect to start operations about spring, 1916, with 250 looms. (Branch of Shamokin, Pa.)

Quakertown. Richland Silk Throwing Company; $15,000; W. Little, pres.; Thomas Potts, supt.; R. G. Williams, buyer; Silk Throwing. (Operating in building of the Quakertown Knitting Mills; owned by Quakertown Silk Mills.)

Shamokin. Eagle, J. H. & C. K.; building new power plant and remodeling buildings for new silk mill to employ from 1,000 to 1,200 hands.

Shamokin. Star Silk Throwing Company; $40,000; P. Frank Barr, pres.; John Tinley, vice-pres.; W. K. Heffelfinger, sec.; William Wayne Wirgman, treas.; Silk Throwing; building new cement mill, 200 feet long, and will install new machinery.

Siegfried. Feldhege Silk Mfg. Co.; built new mill and are installing machinery.

Canada, Ontario, Galt. Riverside Silk Mills; McCormick & Fitch, props.; Water Street; Silk Throwing and Silk and Art. Silk Winding for Knitting Trade; 1,200 spindles; water.

MISCELLANEOUS NEW MILLS

Connecticut, Niantic. The Thames Dyeing & Bleaching Co.; $30,000; Thos. G. Haney, pres., supt. and buyer; John C. Geary, treas.; Bleach, Nitrating, Felting and Spinning Cotton; steam and electric; sell direct.

Georgia, Rome. Southern Bleachery Co., Inc.; $25,000; J. F. Allison, pres.; R. L. Crutchfield, treas.; Clean and Bleach Cotton Fiber.

Illinois, Chicago. Walliser, H. F. Co.; 434 S. Wabash Ave.; $25,000; H. F. Walliser, pres.; R. E. Walliser, treas.; C. O. Walliser, supt. and buyer; Upholstery Trimmings, Cords, Tassels and Fringes; 12 looms; 6 knitting machines; electric; sell direct; buy 8 to 60 merc., 2/26-2/36 worsted, silk floss and twist.

Massachusetts, East Dedham. Dedham Finishing Co.; High cor. Maverick St.; $110,000; Wm. H. Gray, pres. and treas.; Irving W. Bedell, agent and supt.; Bleaching and Finishing Fine Piece Goods; steam, water and electric.

Lowell. Waterside Mills, Inc.; $50,000; Jas. R. Howlett, pres.; Clive E. Hockmeyer, treas.; Convert Velvets, Velvetines, Corduroys, etc.

Sharon. American Core-Twine Co.; $100,000;; Lyon Weyburn (53 State St., Boston), pres.; W. F. Flint, treas. and buyer; Twine, etc.

Springfield. Bozart Rug Co.; $50,000; Wm. M. Stevenson, pres. and treas.; Fiber and Other Rugs.

Westboro. Novelty Weaving Company; 36 Brigham Street; $15,000; Stillman B. Clarke, pres. and supt.; John P. Thorup, treas. and buyer; Tubular Ties, Tie Silks, Silk Beltings, Shirtings; 20 looms; sell direct.

Michigan, Ann Arbor. Ann Arbor Lace Company; $10,000; Charles E. Gallup, pres.; William M. Laird, treas.; Curtains, Draperies and Laces.

Mississippi, Meridian. Mississippi Fiber Co.; $35,000; T. L. Wainwright, pres.; R. P. Osler, treas. and buyer; James Kershaw, supt.; Absorbent Cotton; sell direct.

New Hampshire, Milford. Milford Mfg. Co.; Maurice A. Goldman, agt. and buyer; Thos. M. Morris, supt.; Jute, Linen and Union Canvas; 66 looms; steam and water; sell direct.

New Jersey, Dundee Lake. Crew's Silk Finishing & Piece Dye Works, Paterson; building new silk finishing plant to cost about $500,000.

Hoboken. Progressive Silk Finishing Co.; 622 Clinton St.; Finishing Silk Goods. (Establishing branch here of Paterson.)

Paterson. De Lauder Finishing Co.; No. Paterson; Thos. De Lauder, pres.; F. Brietenstein, sec. and treas.; Finishing Ribbons.

Paterson. Flory Dyeing & Printing Co.; 71 Butler St.; $50,000; Dyeing of Art. Silk, Silk Ribbons; Skein Printing of Art. Silk, Cotton, Worsted, etc.

Paterson. Empire Piece Dyeing & Finishing Co.; 66 George St.; $25,000; Jean M. Thomas, pres. and supt.; Michael E. Manley, treas., agt. and buyer; Dyeing and Finishing Silk Piece Goods; steam and electric.

New Brunswick. Nixon Nitration Works; Metuchen; Lewis Nixon, prop.; Nitrating Cotton; electric power; Stanhope Nixon, buyer.

Paterson. Paterson Bleachery; 52 Warren St.; $100,000; Charles K. McLaughlin, pres. and buyer; Michael H. Doyle, treas.; Charles F. Lynch, agt.; Albert Meyer, supt.; Commission Bleaching, Dyeing and Finishing Cotton Piece Goods.

West Hoboken. Rapid Dyeing & Bleaching Company; $50,000; Embroidery Nets, Dyeing, Bleaching and Finishing.

New York, Dryden. G. B. P. Linen Company; Linen Batting, Cleaned and Carded Upholstery Tow. (Operating old Dryden Woolen Mill.)

Farmingdale. Independent Silk Dyeing Company; $50,000; F. C. Wettlaufer, pres.; R. A. Weber, treas.; Skein Silk Dyeing. (Built new brick mill, 60 by 260 feet.)

Haverstraw. Sheehan Silk Dyeing Co.; Joseph W. Sheehan, pres.; Charles F. Freyfogle, treas.; Frank Schmidt, supt.; Skein Silk Dyeing; steam.

Pennsylvania, Philadelphia. Ashdale Bleachery; Frankford Ave. above Lehigh Ave.; Thos. E. Ashdale, mgr.; Bleach Hosiery, Underwear, Turkish Towels and Cotton Fabrics; steam and electric. (Capacity, 8,000 lbs. daily.) (Contemplate installing a department with special machinery for bleaching and finishing cotton fabrics, also plant for dyeing logwood colors on hosiery.)

Philadelphia. Germania Bleach Works; Kensington and Allegheny Aves.; Peroxide Bleachers of Woolen and Worsted Yarns, Cotton and Mercerized Yarns, Cotton and Silk Hosiery, Knit Goods, Underwear and Fabrics; capacity, 5,000 lbs. daily.

Philadelphia. Crescent Dyeing & Finishing Co.; Womrath & Tackawanna Sts., Frankford; Robt. Lee, pres.; Frank Dowe, treas.; Dye and Finish Hosiery.

Philadelphia. Keeley, John; Nicetown Lane and Kensington Ave.; Bleaching Cotton Fabrics.

Philadelphia. Morice Twine Mills; Twines; William N. Morice, Frank M. Underkuffler, E. W. Brown, John H. Morice, interested.

Philadelphia. Philadelphia Silk Dye Works; Germantown and Hunting Park Aves., Germantown; Fred H. Sharp, pres. and buyer; Chas. A. Hang, Jr., vice-pres.; A. F. Sharp, sec. and treas.; Dyers of Skein Silks, Pure Dye and Weighted Blacks and Colors; steam; capacity 2,000 lbs. daily.

Philadelphia. Reach, A. J. Co.; Tulip and Palmer Sts.; installing spinning machinery to make yarns for base balls.

Philadelphia. Textile Dyeing & Finishing Co., Inc.; 2024 E. Willard St.; $30,000; James F. McLaughlin, pres.; C. J. Hermann, sec. and treas.; W. R. McConachie; Dyers of Woolen, Worsted, Cotton and Union Piece Goods, Finishers of Dress Goods and Men's Wear, Fabrics, Bleaching and Redyeing; steam.

Bristol. Anglo-American Cotton Products Co.; took over the buildings of the Henderson Carpet Co., and installed machinery for preparing cotton for explosion purposes.

Allentown. Penn Finishing Co.; 617 Court St.; Finishers of Chinchillas, Elderdowns, Knitted Fabrics, etc.; steam.

Lansdale. Ayres, William & Sons; started experimental rubberizing and waterproofing plant. Branch of Philadelphia.

Reading. Nicetown Dye Works; Dyers and Bleachers of Hosiery; took over buildings formerly occupied by the Pennsylvania Knitting Mills. (Branch of Phila.)

Rhode Island, Central Falls. Bennett Dye Works; 739 High Street; Dyeing and Bleaching Worsted Yarns for Weaving and Knit Goods; J. Bamford Bennett, buyer.

Pawtucket. Eureka Dyeing & Bleaching Company; Japonica St.; $12,000; Harry E. Kenworthy, pres.; William W. Colons, treas.; William Rogers, supt.; Commission Dyeing and Bleaching.

Phillipsdale. River Spinning Co.; built new mill to bleach raw cotton; branch of Woonsocket.

Virginia, Norfolk. Atlantic Jute Mills; $50,000; Benjamin Margolius, pres.; D. L. Margolius, vice-pres.; Alvin Margolius, sec.; Sylvan E. Myers, treas.; Bagging and Other Jute Products; building new 2-story mill, 60 by 170 feet, of brick, and will install 8 jute cards, 160 spindles, 4 broad looms, 2 pickers, and electric power equipment; expect to begin operations about January 1.

Wisconsin, Janesville. Jones Dyeing & Bleach Works; A. G. Jones, prop.; Skein Yarn Dyeing and Raw Stock Dyeing for the Knitting Trade.

Neenah. National Fiber Textile Co.; $50,000; Peter Thom, pres.; Eugene Szepesi, vice-pres., mgr. and buyer; Harry Price, treas.; Paper Yarns, Twines and Fabrics; dye; electric; Graham Paper Co., St. Louis, Mo., s. agt.; capacity 30,000 lbs. daily.

Canada, Ontario, Bracebridge. Canadian Niagara Linens, Ltd.; $300,000; A. Ferguson Macintyre, pres. and buyer; Linen, Damasks, Towels, Toweling and Specialties; 1,000 spindles; 132 looms; electric; H. J. B. Hamilton, Montreal, Toronto and Winnipeg, s. agts.; office, 24 Empire Bldg., Niagara Falls, Canada.

Important Changes

COTTON

Alabama, Eufaula. Glenola Cotton Mills; taken over by new corporation and new machinery will be added for the manufacture of yarns or sheetings; production of goods will begin about Jan. 1.

Selma. Valley Creek Mfg. Co.; C. W. Taylor, pres.; Milton Saylor, treas.; Robert Coleman, mgr. (Taken over plant of Valley Creek Cotton Mills Co.)

Georgia, Forsyth. Forsyth Cotton Mills; $30,000; R. P. Brooks, pres. and buyer; R. T. Persons, treas. and buyer; W. K. Newton, supt.; 8s-16s yarns; 18-40 inch cards; 3,300 spindles; electric; sell direct. (Reorganization of the Star Cotton Mills.)

Social Circle. Social Circle Cotton Mills Company; seventy-five per cent. of the stock purchased by J. W. Cannon, Concord, N. C., and company reorganized, with M. L. Cannon, pres., and F. S. Etheridge, treas.; Cannon Mills, selling agents.

Maryland, Baltimore. Mt. Vernon-Woodberry Mills; Duck, Twines, Webbing, etc.; reorganized with capital stock of $13,600,000; Geo. Cator, pres.; John J. Nelligan, sec. and treas.

Massachusetts, Boston. Everlastik, Inc.; 179 Lincoln St.; $4,900,000; Bertram T. Martin pres.; William B. Spencer, vice-pres. and gen. mgr.; John Abbott, vice-pres. and counsel; John E. Page, treas.; Walter L. Martin, sec.; Charles B. Stretch, asst. gen. mgr.; Wilwyn Herbert, asst. treas.; Elastic Webbing, Shoe Goring, Braids, Cords, etc.; N. Y. office, 346 Broadway. (Mills at Bridgeport, Conn.; Brockton, Chelsea and Lowell, Mass., and Bayonne, N. J.)

Clinton. Sterling Mills; James Tattersall, prop.; Turkish Towels; moved from Philadelphia to Brodfelt Mill.

North Abington. Victory Webbing Co., Inc.; $50,000; Jas. W. Grimes, pres.; Albert C. Woodward, treas. and buyer; M. Kenney, buyer; Narrow Fabrics; 104 looms; steam and electric; sell direct. (Took over business of A. C. Woodward.)

Mississippi, Batesville. Batesville Fibre Co.; $30,000; Twine and Rope. (Took over plant of Panola Cordage Company; added new bleachery and now bleaching linters.)

New Jersey, Cedarville. Ball, C. C.; W. H. Willis, agt. and buyer; Turkish Towels, Terry Fabric, Novelties; 40 looms; sell direct; buy 20/2, 30/2, 14/1 and 16/1 warp yarns and 12/1 and 16/1 filling yarns. (Starting Bell Cotton Fabric Mill.)

New York, Utica. Utica Spinning Co.; $100,000; Charles W. Wicks, pres.; Wm. B. Foster, treas.; John P. Campbell, agt.; John J. Connell, supt. and buyer; yarn, 20s to 60s; electric; sell direct; took over plant of Utica Fine Yarn Corp.

North Carolina, Durham. Commonwealth Cotton Mfg. Company; Cotton Hosiery and Underwear Yarns. (Purchased by Brodie L. Duke.)

Gastonia. Avon Mills; Sheetings, Shirtings and Yarns; looms are being taken out, and concern will operate only on yarns in the future; installed new carding and spinning machinery.

Hope Mills. Eastern Mills Co.; $500,000; John F. McNair, pres.; W. J. Beattie, Jr., mgr.; took over and will operate the plant of the Hope Mills Mfg. Co.; will re-equip plant.

Kannapolis. Patterson Mfg. Company; Brown Sheetings. (Purchased by the Cannon Mfg. Company.)

Malden. Providence Cotton Mills; Warps and Yarns; merged into Malden Cotton Mills.

Mariposa. Putney Cotton Mills; J. L. Putnam, W. A. Mauney and Hunter Mauney. (Took over Mariposa Mill and started it up.)

Mayworth. Mayes Mfg. Co.; Yarns; name changed to Mayes Mills, Inc.

Mt. Airy. Laurel Bluff Cotton Mills; Cotton Yarns. (Purchased by W. D. Burgess.)

Tarboro. Fountain Cotton Mills; W. A.

Hart, pres.; Harry Smith, treas.; A. M. Vandegrift, supt.; Hosiery Yarns; 7,500 ring spindles; sell direct. (Plant purchased by John H. Rodgers and W. C. Hill, of Norfolk, Va., and W. A. Hart, of Tarboro, N. C.)

Concord. Roberta Mfg. Company; $50,000; J. F. Goodman, pres.; W. W. Flowe, treas.; P. M. Keller, supt. and buyer; Hosiery Yarns; 5,000 ring spindles; water and electric; C. W. Johnston, selling agent. (Purchased interests of Messrs. Robinson and Rankin and rebuilt plant.)

Pennsylvania, Philadelphia. Seidman's, D. Sons; 242 N. 2d St.; Neckwear, Mufflers, Curtain Loops, etc. (Business taken over by Joseph Seidman; to be continued under the old name.)

Philadelphia. Witty, Chas. H. & Co.; Hancock and Huntingdon Streets; Damask, Quilts, Table Covers, etc.; moving to Stenton Ave. and Louden St., Wayne Junction.

Philadelphia. Yarrington Mills Corp.; took over plant and business of Henry Dickel & Sons Co.

Chester. Arasapha Mfg. Company; Fine Cotton and Silk Fabrics. (Merged into the Aberfoyle Mfg. Company.)

Chester. Galey & Lord Mfg. Company; Fine Cotton Goods. (Merged into the Aberfoyle Mfg. Company.)

Williamsport. Eureka Braid Mfg. Company; Silk, Cotton, Mohair and Worsted Braids. (Succeeds the Royal Braid Mfg. Co.)

Rhode Island, Pawtucket. American Yarn Mfg. Company; Sateens. (Plant purchased by the Tamarack Company, Inc.; built one-story addition, 215 by 48 feet.)

Pawtucket. Anchor Webbing Company (Woonsocket); Narrow Cotton Fabrics; purchased plant of the Blackstone Webbing Co.

Wyoming. Regina Spinning Co.; $10,000; Angus Park, pres., treas., buyer and agt.; Wm. Illingworth, supt. and buyer; Weaving, Knitting and Doubling Twist Yarns; steam and water; sell direct; took over plant of Wyoming Yarn Company; will built new picker house and install new picker; change cards and mules over.

South Carolina, Bath. Aiken Mills; William C. Langley, pres.; George E. Spofford, vice-pres. and gen. mgr.; Charles H. Law, sec. and treas.; Sheetings, Shirtings, Prints, etc. (Reorganization of the old Aiken Mfg. Company.)

Clearwater. Seminole Mills; W. C. Langley, pres.; Geo. E. Spofford, vice-pres. and gen. mgr.; Geo. E. Leonard, treas.; D. Tousignant, supt.; Sheetings, Shirtings, Drills, Prints, etc.; 23,104 ring spindles; 508 looms; water and electric; W. H. Langley & Co., selling agents. (Reorganization of the Seminole Mfg. Company.)

Enoree. Enoree Mills; Drills and Sheetings; Allen J. Graham, pres. and treas.; L. L. Clippard, vice-pres.; Hamlin Beattie, sec.; took over the old plant of the Enoree Mfg. Company.

Gaffney. Irene Mills; Table Damasks, Towels, etc.; built new bleaching and finishing plant, 115 by 265 feet, one-story and basement.

Langley. Langley Mills; William C. Langley, pres.; Geo. E. Spofford, vice-pres. and gen. mgr.; Charles H. Law, sec. and treas.; Sheetings, Shirtings, Drills, etc. reorganization of the old Langley Mfg. Company.)

Tennessee, Chattanooga. Chattanooga Aseptic Cotton Company; $50,000; Chester D. Richmond, pres., treas. and buyer; Absorbent Cotton, Gauze, Bandages, etc.; steam and electric. (Succeeds the Aseptic Cotton Products Company.)

Rhode Island, Valley Falls. Hansahoe Mfg. Co.; $500,000; Donald M. Hill, pres.; Francis U. Stearns, vice-pres. and treas.; Fine Cotton Goods; F. U. Stearns & Co., N. Y., selling agts.; took over the property of the Tilton Mills.

WOOLEN

Connecticut, Central Village. Geb, Geo. F. Yarn Mill; Geo. F. Geb, pres., treas. and buyer; Jas. E. Donahue, supt.; Weaving and Knitting Yarns; 2,304 spindles; steam; sell direct; took over old Central Yarn Mill.

Elmville. Sonnhill Worsted Co.; Worsteds, Overcoatings and Cloakings; name changed to the Whitestone Worsted Company.

Rockville. Rockville Worsted Company leased by George Daniels, formerly of the Daniels Worsted Mills, West Rutland, Mass.

Kentucky, Campbellsville. Campbellsville Mfg. Co.; Jeans, Linseys, Yarns, and Blankets; purchased by L. B. Smith, formerly president and manager of the concern, who is offering it for sale.

Maine, East Wilton. East Wilton Worsted Mills; Everett W. Adams; Jas. S. Plummer; Worsted Goods. (Leased Walker Mills.)

Oakland. Oakland Woolen Mills Co.; Men's Wear, Suitings and Overcoatings. (Taken over by American Woolen Co.)

Princeton. Princeton Woolen Mill; Geo. B. McKechnie; Jason Greenlaw; Woolen Yarns; 240 spindles; gasoline. (Formerly operated by Stephen L. Peabody.)

Sangerville. Sangerville Woolen Mill; Fancy Cassimeres. (Leased and started up by the Old Town, (Me.) Woolen Co.)

Maryland, Reistertown. Oakland Mill; Woolen Suitings; puchased by John C. Melville and William H. Duval. (Name changed to Melville Woolen Company, branch of Chambersburg, Pa.)

Massachusetts, Enfield. Quabbin Mfg. Co.; L. S. Bartlett; Woolen Goods; 4 sets; 50 looms; dye and finish; steam and water. (Taken over plant of Enfield Mfg. Co.)

Gleasondale. Gleasondale Woolen Mill; $100,000; Nathaniel Stevens, pres.; Chas. E. Roberts, treas. and manager; Woolen Cloakings, Suitings, etc.; 9 cards; 54 looms. (Formerly Est. of A. D. Gleason.)

Medway. Anderson & Simpson; leased shoddy mill from Medway Mfg. Co.

Monson. Quaboag Woolen Mills; Cloakings, Overcoatings and Novelty Goods. (Took over old Somerset Woolen Mill.)

Oxford. Dolge Felt Co.; $150,000; Fritz Dolge, pres., treas. and buyer; Felts; 6 cards; 3 hardeners; dye; water and electric. (Took over plant of Stansfield Felt Mills, Inc.)

Palmer. Loudon, Joseph; took over old Ford, Hawkes plant, and will start up a shoddy mill.

Pittsfield. Berkshire Woolen Co.; $700,000; Edgar L. Gillett, pres.; Jas. R. Savery, treas.; Jas. Chapman, clerk; Woolens and Worsteds. (Took over plant of Berkshire Woolen & Worsted Co.)

Smith's. Wyman-Castle Mills, Inc.; leased Swift River Mill; operating as branch of mill at Wales.

South Acton. South Acton Woolen Company; $75,000; William Rawitser, pres. and ass't treas.; Fred Rawitser, treas. and clerk, and Frank G. Smith, Jr.; Shoddy and Wool Extracts. (Succeeds the South Acton Woolen Co., of Fred and William Rawitser.)

Wales. Wyman-Castle Co.; $75,000; Henry C. Castle, pres.; Charles M. Wyman, treas.; Eugene O. Connell, supt.; Fine Woolens; Henry C. Castle, Inc., 161 Devonshire St., Boston, selling agts. (Took over and repaired old local mill.)

West Rutland. Daniels Worsted Mills; name changed to Naquog Worsted Mills.

Minnesota, Fergus Falls. Fergus Falls Woolen Mills Co., Inc.; Oliver Olson, pres.; Nels Haagenson, vice-president; C. O. Utne, sec.; A. G. Anderson, treas.; Blankets, Flannels, Mackinaws, etc. (Took over plant of Fergus Falls Woolen Mills.)

New Jersey, Passaic. Algonquin Company; Cotton Warp Woolens. (Taken over by Theo. Tiedeman & Sons.)

New York, Jamestown. Jamestown Worsted Mills; Sheldon R. Broadhead, pres.; Almet N. Broadhead, treas.; William R. Reynolds, sec.; Dress Goods and Suitings. (Taken over by William Broadhead & Sons, owners of the Broadhead Worsted Mills.)

Valatie. Valatie Yarn Company, Inc.; $10,000; Willis G. Barnet, pres. and buyer; T. Tannewald, treas. and supt.; Merino Yarns; 4 cards; 960 spindles; dye; steam; sell direct and Percy A. Legge, Boston and Philadelphia, selling agent. (Formerly Valatie Yarn Company.

Pennsylvania, Philadelphia. Comet Spinning Mills; Howard and Berks Sts.; Woolen and Merino Yarns for Weaving. (Taken over by Byrne & Hance Spinning Co.)

Philadelphia. Fern Rock Woolen Mills; Trenton and Wishart Sts.; Cloakings, Dress Goods and Men's Wear. (Purchased by the Cleveland Worsted Mills Co., of Cleveland, Ohio.); will make fine worsteds.

Philadelphia. Gordon, A. J., & Company; Men's Wear, Pillow Slips and Couch Covers; moving their plant to Kensington Ave. and Huntingdon St., in order to increase their facilities for manufacturing; installed new machinery.

Philadelphia. Kelly & Lampe; Ripka Mill; Main and Carson Sts.; Woolen and Merino Yarns for Weaving and Knitting up to 25, Worsted, Skein, Hanks and Tubes; 4 sets; 2,240 mule spindles; 4 twisters; 4 reels; steam. (Commission spinners.) (Took over plant in Ripka Mill formerly operated by Halliday & Zahn.)

Philadelphia. Ring's, Mark D., Sons Company; Woolen and Merino Yarns; 8 sets; 6,376 mule spindles and 1,168 twisting spindles. (Formerly Mark D. Ring & Company.)

Philadelphia. Rooba Mfg. Company; Men's Wear and Dress Goods; moved to Megown Mills, Adams and Church Sts.; installed 30 new looms; increasing their production.

Philadelphia. Schofield, Mason & Company; Cumberland, Fairhill and Reese Sts.; Wilton and Brussels Rugs and Carpets. (Taken over by a new corporation and continued under same name.)

Bristol. Henderson, William & Co.; Scotch Art Rugs and Brussels Carpets; (moving to Frankford, Phila.)

Burmont. Burmont Mill; Columbia Worsted Co.; leased by John Whittaker and Chas. Stanley of Philadelphia; name changed to Lansdowne Worsted Mills; make French spun worsted yarns.

Clifton Heights. Kent, Thos., Mfg. Company; Henry T. Kent, pres.; Chas. J. Webb, vice-pres.; Col. Jas. A. G. Campbell, treas.; N. S. Keay, sec.; Uniform Cloths, Covert Cloths, Blankets, etc. (Reorganized.)

Rhode Island, Allendale. Centredale (R. I.) Worsted Mills taken over worsted yarn plant formerly operated by Stillwater Worsted Co.

Greenville. Continental Worsted Company; leased the Greenville Mill, formerly operated by the Smithfield Worsted Company, and operating it as a branch of the mill at Olneyville, Providence.

Warren. Warren Worsted Mill. (Purchased by the J. W. Bishop Company of Worcester, Mass.)

Canada, Ontario. Dundalk. Dundalk Woolen Mills; W. H. Irving, prop.; Woolen Yarns, Blankets, Flannels and Tweeds. (Took over old Dundalk Woolen Mills which have been idle.)

KNIT

Alabama, Fort Payne. W. B. Davis & Son; Took over Florence Hosiery Mill; built two new mills for manufacturing, dyeing, bleaching and finishing hosiery; increased equipment to 250 knitting machines.

Indiana, Richmond. Richmond underwear Co.; Men's and Women's Ribbed Underwear; name changed to Atlas Underwear Company. (Plant operated by Atlas Underwear Co., of Piqua, Ohio.)

Massachusetts, Needham Heights. Moseley & Co., Inc.; $60,000; Chas. B. Moseley, pres.; C. F. Kendall, treas.; William Moseley, director; Underwear. (Took over plant and business of Moseley & Co.)

Michigan, Colon. Lamb Knit Goods Co.; will take over business of Three Rivers (Mich.) Knitting Co.; and add the manufacture of woolen and worsted yarns.

Detroit. Detroit Textile Fabric Company; 12th St. and Grand Trunk R. R.; Astrachan Cloth and Knitted Fabrics. (Moved from Grand Rapids and changed name from Williams Glove and Gauntlet Co.); erected a dye house and bleachery.

Minnesota, Duluth. Nelson Knitting Mills Co.; $25,000; A. Nelson, pres.; J. P. Jenson, treas.; Underwear, Hosiery, Sweaters and Fancy Knit Goods. (Succeeded Nelson Bros. Knitting Mills.)

New Hampshire, Berlin. Berlin Knitting Company; J. Wallace, prop.; Sweater Coats; electric; sell direct; buy worsted and woolen yarns. (Moved to Berlin from Bangor, Me.)

New Jersey, Montclair. Ospa Hosiery Mills; $100,000; Frederick O. Schenke; Hosiery and Other Knit Goods.

New York, Amsterdam. Loevenheim, L.; Purchased equipment of Ulster Knitting Mills, Kingston, N. Y., and moved it to Amsterdam.

Kinderhook. Hoag, C. F., Co.; Gloves and Mittens. (Bought plant of Van Buren Knitting Co., branch of Poughkeepsie.)

New York City. Pioneer Braid Mfg. Company; $20,000; Braids and Soutaches; 300 braiders. (Taken over by Harry, Joseph and Lizzie Aldman, and operated under the same name.)

New York City. Trabuiski, N. & J., & Company; Knitted Ties and Novelties; have moved to 475 Broadway; installed new equipment.

Utica. Lynch Knitting Company; Towels and Wash Cloths. (Name changed to Clover Knit Goods Company.)

Utica. Ritesize Underwear Company; Ribbed Underwear and Union Suits; (moved to larger quarters at the corner of First St. and Park Ave.)

Valatie. Startext Co., Inc.; $30,000; Wallace and Holland Foster, and Sylvester C. Grady, interested. (Understood will take over and start up plant of the Stark Textile Company.)

North Carolina, Wilmington. Wilmington Hosiery Mills; $100,000; J. H. Kuck, pres., treas., and buyer; R. E. Calder, sec.; H. F. Martinat, supt.; Men's and Women's Hosiery; 146 knitting and 2 sewing machines; dye and finish, electric; took over business of Kuck's Hosiery Mills, and building new mill.

Ohio, Cleveland. Elbel Knitting Works; Sweater Coats, Cardigans, Novelties, etc.; moved from 2033 West 52nd St. to larger quarters at 6708 Loraine Ave.; installed new knitting machinery.

Pennsylvania, Philadelphia. Acme Knitting Co., Inc.; Knitted Neckties, Sweaters, etc.; have moved from 2042 East Clementine St. to larger quarters at 2787 Emerald Street.

Philadelphia. Belmont Mfg. Co., Silk Knitted Neckwear, moved to Wright Bldg., Broad and Huntingdon Sts., enlarging plant; installing new winding department.

Philadelphia. Eagle Knitting Company; 214 W. Dauphin St.; Bathing Suits and Jerseys; moved their plant to larger quarters at Hancock and Huntingdon Sts.

Philadelphia. International Silk Knitting Company; Jasper and Orleans Sts.; Full Fashioned Silk Hosiery. (Purchased by Wucherer, Vogel Bros. and Wildemuth.)

Philadelphia. Kenmore Knitting Mills, 223 N. 4th Street; Silk Knitted Neckwear; gas; sell direct. (Formerly located at 4143 Emerald St.)

Philadelphia. Mathias Bros.; 3560 N. Marshall St.; have moved their plant to larger quarters at Kensington Ave. and Venango St.

Philadelphia. Pigeon Knitting Company; Women's Seamless Hosiery; removed their plant from 746 East Westmoreland St. to 4715 Edgemont St.

Philadelphia. Puritan Knitting Mills of Pa.; 313 Arch St.; Sweater Coats, etc.; took over machinery of Fairmount Knitting Mills, which has discontinued operations.

Philadelphia. Quaker Knitting Co.; Silk Knitted Neckwear; have moved to 119 North Camac St.

Carbondale. Carbondale Mills, Inc.; $75,000; Max Steiner, pres.; William A. Friedman, sec.; Jacob Russ, treas.; Sweaters, Infants' Goods and Fancy Knit Goods. (Succeeds Carbondale Knitting Mills.)

Lebanon. Deeds, H. K., Est. of; Seamless Hosiery. (Plant leased by New Idea Hosiery Co. of Harrisburg, Pa., and name changed to Lebanon Valley Hosiery Mill.)

Manheim. Manheim Underwear Company; Walter W. Moyer, treas. (Taken over plant of the Manheim Knitting Mills.)

New Cumberland. Elkwood Mills, D. O. Shuler, mgr.; opened up old Elkwood Mills which have been closed for several months. Plant contains 9 knitting and 19 sewing machines, on Union Suits, Swiss Vests and Babies' Wrappers.

Plymouth. West, Ambrose, Knitting Co.; $150,000; Ambrose West, pres.; T. William West, vice-pres. and gen. mgr.; Spencer R. Naylor, treas.; Men's and Women's Seamless Hosiery; 600 knitting machines; Cromie & Plunkett, 366 Broadway, selling agents. (Took over the business of A. West, who operated the Pioneer Knitting Mills.)

Reading. Bausher, S. D.; Women's Underwear, leased plant of Schultz Underwear Company, to help fill orders.

Reading. Spatz & Spannuth, Inc.; $10,000; B. H. Spatz, pres., supt. and buyer; H. A. Spannuth, treas.; Half Hose; 24 Knitting machines; electric; Wilfred Gray, selling agt.; took over B. H. Spatz Knitting Co.

Richland. Richland Hosiery Mill; Men's Seamless Half Hose; 15 finishing machines; 100 knitters; 40 ribbers. (Name changed to A. C. Haak Knitting Mills. A. C. Haak, prop. and supt.)

Rhode Island, Providence. New England Hosiery Company; Mercerized Hosiery; moved to larger quarters at 34 Bassett St.

Wisconsin, Appleton. Saxony Knitting Works; Mittens, Gloves, Cardigans, Sweaters, and Fancy Knit Goods. (Name changed to Zwicker Knitting Mills.)

Milwaukee. Racine Underwear Mills; $25,000; J. H. Rubin, pres.; Thos. Swoboda, treas.; Geo. B. Fettig, supt.; Fred Braun, buyer; Men's, Women's and Children's Underwear; electric; sell direct. (Moved to Milwaukee from Steven's Point.) Name changed to Racine Underwear, Inc.

Milwaukee. Reliable Knitting Works; Fancy Knit Goods. (Moved to new and larger quarters at 17th and Wells Sts.); increased capital stock to $25,000.

Sheboygan. Hand Knit Hosiery Co.; Gloves, etc.; took over plant of Zahn Knitting Co., at Two Rivers and will operate it as a branch plant.

Superior. Superior Knitting Mill; Sweater Coats, Toques, and Hosiery; purchased by Christ Nelson.

Canada, New Brunswick, Moncton. Humphrey Unshrinkable Underwear, Ltd.; Men's, Women's, and Children's Wool Underwear and Men's Seamless Half Hose. (Name changed to the Atlantic Underwear, Ltd.); installed 50 new sox machines.

Ontario, Alton. Beaver Knitting Mills, Ltd.; Men's Wool Ribbed and Flat Knitting Underwear. (Took over the business of the Beaver Knitting Mill.)

Ontario, Carleton Place. Hawthorne Mills; R. Thomson, C. W. Bates; Carl Hey, supt.; Blankets, Men's Heavy Half Hose and Underwear; 5 sets; 8 sewing machines; 10 looms; dye (raw stock); steam; Wilson & Patterson, Montreal and Toronto, selling agts. (Took over plant of Waterloo Co.)

Ontario, Parkhill. Parkhill Knitting Company; Wool Socks. (Taken over and operated by R. J. Strauss.)

Ontario, Toronto. Allen Bros. Co. Ltd.; $40,000; 817 Gerrard St. East; Chas. R. McKenzie, pres.; A. M. Huestis, treas.; K. W. Allen, vice-pres.; J. M. and K. W. Allen mgrs. and buyers; Cashmere and Silk and Cashmere Hosiery; electric; Richard L. Baker & Co., Toronto, selling agents. (Succeeds Allen Brothers Co.)

Ontario, Toronto. May Mfg. Company; merged with Best Knit, Ltd., of Brampton, Ont.

Quebec, Shawinigan Falls. Shawinigan Knitting Company; Women's and Children's Underwear. (Rented by J. R. Moodie & Sons, Ltd. of Hamilton, Ont.)

SILK

Connecticut, Mystic. Robinson Silk Co. leased the Ninigret Silk Mill, formerly operated by the Mystic Silk Company and will install 50 new looms.

New Jersey, Paterson. Hicks, Frank L. Neckwear Silks; moved from 537 Totowa Ave. to Hamilton Mill, Mill Street.

Paterson. Khalizog Silk Company; Broad Silks; moved from Barnett Mill to Murray Mill.

Paterson. Reines, I.; Broad Silks. (Succeed Cohen & Reines.); installed 6 new looms.

New York, Astoria. Champion Silk Company; Alfred Robinson, supt.; Broad Silks; 130 looms; H. A. Caesar, selling agent. (Taken over by J. A. Migel; mill designated as Champion Mill of J. A. Migel.)

New York City. Ballow, Edw. W., Co.; Silk Braids; moved to 244 West 23rd St. from 127 West 25th St.

New York City. Full Fashion Silk Hosiery. (Moved to 23 Beaver St., New York City; from 30 Main St., Brooklyn, N. Y.)

Whitestone. Elandes Ribbon Company; $40,000; Jean Langenieux, and Albert Sopp interested. (Took over plant of Atlas Ribbon Mill.)

Pennsylvania, Allendale. Orion Textile Co.; Broad Silks. (Took over plant and equipment of the Keystone Textile Co.)

Catasauqua. Catasauqua Silk Company; Broad Silks. (Plant leased by the Anchor Silk Company.)

Kane. Thissen Silk Mfg. Co.; Silk Gloves Linings, etc. (Name changed to Sakura Silk Company.

Norristown. Ironwarp Silk Co.; Broad Silks; took over plant of Fred'k Ott, and enlarging.

Royersford. Royersford Embroidery Company; Embroideries. (Purchased by Robert Myers; additional machinery installed.)

Stroudsburg. Lippman Silk Mfg. Company; Broad Silks; 88 looms. (Succeeds Lippman & Abrash.)

Towanda. Hartley Silk Company; C. H. Jennings, pres.; W. Worth Jennings, vice-pres.; E. Floyd Kizer, treas.; John Hartley, gen. mgr. (Succeeds the Hartley Silk Mfg. Company.)

Weatherly. Weatherly Broad Silk Company; James A. Malone, pres.; Charles A. McGowan, treas. and buyer; Crepe Silks; 66 looms; sell direct to jobbers. (Took over Onoko Silk Mill.)

York. Franklin Silk Mills; purchased new building on West Princess St.; equipment from Ashley & Bailey Mill to the new one; increased equipment to 300 looms and auxiliary machinery.

MISCELLANEOUS

Massachusetts, Barrowsville. Defiance Mfg. Co.; $800,000; John B. Stetson, Jr., pres.; Arthur Van Sielen, 311 Madison Ave., New York City, gen. mgr., selling agent and buyer; C. H. Watmough, supt. and resident mgr.; Tracing Book, Tag and Blue Print Cloth. (Took over plant of Barrowsville Bleachery and making enlargements.)

Attleboro. Attleboro Braiding Co.; $50,000; reported will start up plant of Jas. Orr Dyeing & Braiding Company.

New Jersey, Paterson. Victory Finishing Company; Louis A. Rey; $25,000; Dyeing and Finishing. (Took over dyeing and finishing department of Dexter, Lambert & Co.)

New York, Brooklyn. Werner, William, Inc.; $10,000; Dyeing Silks and Mercerized Cotton. (Took over the business of William Werner.)

Chadwick's. Utica-Willowvale Bleaching Co.; merged with Utica Steam & Mohawk Valley Cotton Mills; capital increased to $2,500,000; no changes in management or policy of either plant.

Niagara Falls. Niagara Falls Linen Company; Linen Damasks, Union Huck and Toweling. (Bought by Lockport Textile Company.)

Pennsylvania, Philadelphia. Tomalino Silk Dyeing Company; Natural and Artificial Silk in Skeins; moving from Wayne Junction to Tackawanna and Womrath Sts., Frankford.

Reading. Jackson, Thomas & Son Co.; $250,000; Manila, Sisal and Jute Rope, Cordage and Twine. (Took over business of Thomas Jackson & Son.)

Enlargements and Improvements

COTTON

Alabama, Alexander City. Russell Mfg. Co., Inc.; Cotton Yarns and Underwear; added 912 spindles.

Athens. Fulton Cotton Mill; Army Duck and Cotton Yarns; installing new power equipment.

Birmingham. Avondale Mills; installed 23,000 new spindles and preparatory equipment to replace old machinery.

Florence. Ashcraft Cotton Mills; installed 160 new automatic looms.

Huntsville. Abingdon Mills; Drills, Ducks, and Osnaburgs; building new addition; installing 5,000 new spindles.

Huntsville. Merrimack Mfg. Co.; installed 161 new automatic looms in No. 1 mill.

Piedmont. Coosa Mfg. Co.; Cotton Yarns; built extension to No. 2 mill; added 10,000 spinning spindles and 5,000 twister spindles.

Siluria. Buck Creek Cotton Mills; installed electric motors and changed over to electric power.

Sylacauga. Eva Jane Mill; White and Colored Goods from Coarse Yarns; building addition and will add 4,000 spindles to manufacture coarse yarns; added new electric power equipment.

Sylacauga. Marble City Mills; Hosiery Yarns; added 1,000 spindles.

Connecticut, Danielson. The Connecticut Mills Company; Tire Fabrics; built addition; increased equipment.

Danielson. Quinebaug Company, added 250 new looms; increased capital stock to $750,000; reported will add $100,000 worth of new equipment.

Greenville. Shetucket Company; Tickings, Denims and Awnings; new 2-story brick weave shed, 84 by 356 feet; to add 1,000 new looms and several thousand spindles.

Killingly. Killingly Mfg. Company; Tire Fabrics; building enlargement to triple the weaving capacity; new weave shed, 2 stories high, 172 by 152 feet, saw tooth roof.

Middletown. Russell Mfg. Co.; adding a new addition 80 by 488 feet with an ell, 30 by 320 feet of reinforced concrete.

Moodus. Chace Mill and Williams Mill; (Hall, Lincoln & Co.); Cotton Yarns, Twine and Duck; increased machinery equipment and added electric motors for auxiliary power.

Moodus. New York Net & Twine Co.; Twine, Cords, etc.; installed new power equipment.

New London. New England Carpet Lining Co.; addition constructed to double capacity.

Putnam. Manhassett Mfg. Company; Tire Fabrics; built new 3-story addition, with 10,000 square feet manufacturing space; increased equipment; also building new addition 2 stories high; 180 by 120 feet; increased capital stock to $525,000.

Uncasville. Uncasville Mfg. Co.; erected a 1-story brick addition, 100 by 50 feet, to be used for spinning; installing a quantity of new machinery.

Unionville. J. Broadhurst & Son, Inc. Built addition to yarn department; to discontinue night work; business incorporated with capital stock of $125,000.

Georgia, Athens. Southern Mfg. Co.; erected new addition and installed new looms.

Atlanta. Exposition Cotton Mills; built a $11,000 brick addition to be used as a cloth storage warehouse.

Augusta. Riverside Mills; built 3 warehouses, 53 by 150 feet each.

Augusta. Sibley Mfg. Co.; installed an entire new set of pickers; 86 new 40-inch cards.

Canton. Canton Cotton Mills; installed new cards; new opening and blowing system; new slasher room.

Chickamauga. Crystal Springs Bleachery Company; installed new spinning frames; enlarged bleachery and warehouses.

Columbus. Bibb Mfg. Co.; Hosiery Yarns, building addition and will install 18,000 spindles with looms to manufacture tire fabrics.

Columbus. Eagle & Phenix Mills; Denims, Tickings, Cheviots, etc.; replacing old weaving equipment with 375 new looms.

Columbus. Hamburger Cotton Mills; reorganized with Harry L. Williams, pres.; Wm. S. Hamburger, treas.; Guy Garrard, mgr.; added 4,000 spindles.

Columbus. Muscogee Mfg. Company; Denims, Stripes, Tickings, etc.; making extensive enlargements.

Columbus. Swift Spinning Mills; installed 12 new cards.

Fitzgerald. Fitzgerald Cotton Mills; Coarse Yarns; built new addition 200 by 40 feet; installed 100 looms.

Forsyth. Ensign Cotton Mills; Yarns; erecting new addition 2 stories high with basement 145 by 75 feet; installing 6,000 spindles; erecting new houses for employes and a new church and school.

Griffin. Griffin Mfg. Co.; Colored Cotton Goods; installed 200 new automatic looms.

Griffin. Kincaid Mfg. Co.; Mill No. 2; Crashes, Towels and Damasks, etc.; installed 2 slashers; 160 looms; 8,500 spindles.

Griffin. Rushton Cotton Mills; Fancy Dobby Weaves; Domets, Shirtings; installed 5,000 new spindles.

Hogansville. Hogansville Mfg. Co.; (International Cotton Mills); erecting a new 2-story extension, 275 by 105 feet; and a new 4-story storehouse, 100 by 105 feet, and a small waste house.

Lafayette. Lafayette Cotton Mills; Jeans; installed 200 new 40-inch automatic looms.

Macon. Bibb Mfg. Co.; expended $200,000 for enlargements and improvements, remodelling mills and adding new equipment.

Newman. McIntosh Mills.; added new card room equipment and twisters.

Newman. Newman Cotton Mills; built new opener room, 60 by 60 feet.

Rome. Anchor Duck Mills; built addition and installed new waste yarn equipment and 20 bag looms; installed a filtering plant.

Illinois, Aurora. Aurora Cotton Mills; Sheetings; installed 600 new automatic looms replacing old equipment.

Kentucky, Maysville. January & Wood Company; Twines, Clothes Lines, etc.; built new 4-story mill, 116 by 70 feet.

Louisiana, New Orleans. Alden Mills; Seamless Cotton and Ribbed Hosiery; erected new 3-story brick addition.

Maine, Augusta. Edwards Mfg. Co.; Print Cloths, Sateens and Sheetings; erected a one-story addition 60 by 40 feet.

Biddeford. Pepperell Mfg. Company; Sheetings, Drills, etc.; increased power department; installed four 500 h. p. water tube boilers; 1-4,000 k. w. turbine; built new 250-foot chimney.

Maryland, Savage. Savage Mfg. Co.; Cotton Duck; built addition; installed new hydro-electric plant and individual motors.

Massachusetts, Adams. Renfrew Mfg. Co.; Wash Goods, Damask, Warps; installed new picking, carding and spinning equipment; revamping spinning dept. and adding total of 30,000 new spindles.

Blackstone. Blackstone Mfg. Co.; Mulls, Shirtings, etc.; built 2-story addition, 80 by 130 feet, brick.

Boston. Cynthia Mills; Crochet Cottons; increased capital stock to $100,000; enlarged output.

Boston. Star Webbing Works; Narrow Woven Fabrics, etc.; installed 18 new looms.

Clinton. Lancaster Mills; Shirtings, Ginghams, etc.; remodeled finishing department; installed new dryers, installing new weaving machinery.

Easthampton. West Boylston Mfg. Co.; installed 200 new looms for weaving tire fabrics.

Fall River. Border City Mfg. Co.; replaced old machinery in yarn department with new equipment.

Fall River. Davis Mills; Cotton Goods; erected new building, 50 by 110 feet, for storage purpose; installed automatic sprinklers.

Fall River. Flint Mills; Cotton Goods; installed new spinning machinery.

Fall River. Osborn Mills; Cotton Goods; installed new baler breaker; openers; spinning frames and combers.

Fall River. Pocasset Mfg. Co.; Sateens, Twills, etc.; remodeled Mill No. 2.

Fall River. Sagamore Mfg. Company; Print Cloths; installed 30,000 new spinning spindles; built new cotton storage shed, 50 by 70 feet; wood.

Fall River. Stevens Mfg. Co.; Damasks, Quilts, etc.; built new brick storehouse, 68 by 150 feet.

Fall River. Toohey, M. J. & Co.; Cotton Rope Banding, Braids and Tapes; building new concrete mill to replace burned plant.

Fitchburg. Parkhill Mfg. Co.; built new dye house, 200 by 100 feet; 4 stories high, for yarn dyeing.

Griswoldville. Griswoldville Mfg. Co.; Buntings, Crinolines, etc.; overhauled plant; improved bleachery.

Holyoke. Merrick-Hadley Mills; (American Thread Co.); Spool Cotton; erecting new 2-story brick storehouse; installing new machinery; rearranging old equipment.

Lawrence. Everett Mills; Colored Cotton Goods; installed 18,000 new spindles.

Lawrence. Pacific Mills; Cotton and Worsted Dress Goods; bought printing department of the Merrimack Mfg., Lowell.

Lowell. Appleton Company; Flannels and Ginghams; erected new reinforced concrete storehouse 10 stories high; added $75,000 new equipment.

Lowell. Bay State Cotton Corp.; Tire and Sail Duck; erected new 2-story and basement mill, 296 by 65 feet, concrete; to install 2,592 tw. spindles; 100 looms.

Lowell. Merrimack Mfg. Co.; Corduroys, Velveteens, and Khaki; expanded weaving department, enlarging dyeing department.

Lowell. Tremont & Suffolk Mills; Flannels, Drills, etc.; new addition 5 stories high, 140 by 43 feet; rearranged equipment and added new finishing machinery.

New Bedford. Butler Mill; Fine Cotton and Cotton Yarns; building new weave shed.

New Bedford. Dartmouth Mfg. Corp.; Cotton Goods; built 3-story addition, 30 by 420 feet; increased spinning department; installed new machinery.

New Bedford. Grinnell Mfg. Corp.; Cotton Goods; increased capital stock to $1,500,000.

New Bedford. Hathaway Mfg. Co.; Fine Cotton Goods; building brick addition, 250 by 100 feet; to No. 1 spinning mill, and wooden bridge 120 feet long to connect with No. 2 weaving mill.

New Bedford. Holmes Mfg. Co.; building new 2-story waste house, 36 by 74 feet; and new 1-story recovery plant, 50 by 86 feet; and new covered bridge connecting the new waste house and the picker room of new building; installed new twisting frames.

New Bedford. Jones, William C., Co.; Cotton Waste.; installed new waste machinery.

New Bedford. Kilburn Mill Yarns; built new brick mill, 160 by 140 feet, 3 stories high and basement; built addition to storehouse, 100 by 120 feet, 3-stories high, brick; altered power department.

New Bedford. New Bedford Textile Co.; Bands, Braids and Rope; built new office building.

New Bedford. New England Cotton Yarn Co.; built enlargement; replaced old equipment with new machinery.

New Bedford. Potomska Mills, Linens, Lawns, Sateens, etc.; erected new brick and concrete boiler house, 50 by 30 feet, and 40 feet high, with smoke stack 150 feet high.

Newburyport. American Textilose Co.; Yarns; installed 2,000 twister spindles; installed new looms to weave tire fabrics.

Rockland. Rockland Webbing Co.; Narrow Fabrics; built new plant; new addition for storage purposes; installed new looms.

Saundersville. Saunders Cotton Mills; Shirtings and Sateens; built new lavatory addition; also new boiler house; installed three new boilers.

Shirley. Samson Cordage Works; Cords, Lines, Twines, etc.; installed new power equipment; also new concrete flume, 60 by 12 feet.

Taunton. Old Colony Mfg. Corp.; Drills and Yarns; installing new picking and carding machinery.

Walpole. Standard Woven Fabric Co.; Brake Linings, Fire Hose, etc.; bought old factory building, branch of Framingham.

Ware. Otis Company; Denims, Stripes, Woven Goods and Underwear; building new 3-story mill to replace present No. 2 mill.

Webster. Slater, S., & Sons, Inc.; Sateens, Percalines, etc.; built one-story brick dye house, 78 by 172 feet; also new store house; made extensive repairs; installed new power equipment; erected new weave shed 1-story and basement, 174 by 293 feet; built new brick mill, 4 stories and basement, 175 by 132 feet; rearranged sorting, scouring, drying and yarn departments.

Webster. Stevens Linen Works; Linen Crash; installed new bleaching machinery.

Westboro. Westboro Weaving Company; Narrow Fabrics; erected new storehouse and dye house; installed 20 new looms; built addition, 30 by 50 feet, to storehouse.

West Warren. Warren Cotton Mills; Tickings, Denims, Cottonades, etc.; installed new machinery in No. 3 Mill.

White Valley. White Valley Mills; White Bros.; Denims; installed new spinning machinery to replace old equipment.

Williamstown. Boyd, John S., Company; Corduroys and Velveteens; erected new concrete and steel bleach house, 2 stories high, 42 by 92 feet.

Williamstown. Greylock Mills; Warp Yarns; installed new machinery to increase output 20 per cent.

Worcester. Mills Woven Cartridge Belt Co.; Heavy Cotton Fabrics; built new 3-story addition 60 by 28 feet; also an addition 3 stories high, 21 by 27 feet; installed 164 new looms.

Mississippi, Stonewall. Stonewall Cotton Mills; Sheetings, Shirtings, Ducks, etc.; installed 60 new 40-inch automatic looms.

West Point. Cardinal Mills; Yarns; doubling the output of their plant.

Winona. Winona Cotton Mills; Sheetings and Drills; installed new humidifiers.

New Hampshire, Barnstead. New Hampshire Artistic Web Co.; Braids, Belts, Laces, etc.; built addition.

Manchester. Amoskeag Mfg. Company; Tickings, Denims, Ginghams, etc.; built two new cotton storehouses, 80 by 80 feet each; also one bag mill, 3 stories high, 500 by 130 feet; also addition to cotton shed, 64 feet long and 96 feet deep, consisting of four sections.

Nashua. Nashua Mfg. Company; Cotton Flannels, Blankets, etc.; built addition to turbine house; erected new warehouse, 8 stories high, 320 by 145 feet, concrete, installed automatic box looms to replace old equipment; built addition to spinning and weaving departments.

New Ipswich. Columbian Mfg. Company; Denims, Stripes, etc.; installed new power equipment.

Salmon Falls. Salmon Falls Mfg. Company; Cottons; built addition to cotton house.

New Jersey, East Orange. Seabury & Johnson; Absorbent Cotton and Gauzes; installed new bleaching kiers to increase their production.

Newark. Clark Thread Co.; Spool Cotton; installed new mercerizing machinery.

Newton. Standard Towel Company; Turkish Towels; purchased building the concern occupies; built new boiler room; installed new machinery; overhauled bleachery.

Passaic. Passaic Cotton Mills; Tire Duck and Fire Hose; increased capital stock; increasing plant.

Sussex. Sussex Mills; A. L. Anable, prop.; Turkish Towels, Wash Cloths, etc.; installed new jacquard machines and other equipment.

North Carolina, Albemarle. Efird Mfg. Co.; Hosiery Yarns and Sewing Twine; new 2-story mill, 360 by 107 feet; extensive enlargements and improvements.

Albemarle. Wiscassett Mills Co.; Cotton Yarns; new mill, 330 by 107 feet, 2 stories high; also picker house, 107 by 56 feet; also 1-story winder room, 150 by 80 feet; installed 12,000 spindles.

Bladenboro. Bladenboro Cotton Mills; Hosiery Yarns; will install additional machinery to cost $50,000; will erect an additional building.

Charlotte. Robinson Mfg. Co.; Hosiery Yarns; built addition and installing new machinery including 4,000 spindles.

Cherryville. Howell Mfg. Co.; yarns; plan to double capacity early next year.

Concord. Brown Mfg. Company; Domets, Ginghams, etc.; installed new automatic looms to replace old equipment; also installed new finishing equipment.

Draper. German-American Mill; Thread Mills Co., props.; built new 1,000-loom wide sheeting mill.

Duke. Erwin Cotton Mills Co.; Denims; installed two new boilers, a steam turbine and several motors.

Durham. Golden Belt Mfg. Co.; Sheetings and Tobacco Bags; installed 528 new automatic looms to replace old equipment.

Edenton. Edenton Cotton Mills; Yarns; erecting three new buildings, 72 by 80 feet, 56 by 80 feet, 101 by 52 feet; will install 8,000 spindles.

Franklinville. Franklinville Mfg. Company; Seamless Bags; increased capital stock to $130,000; built new addition; installed 3,000 spindles and 50 looms.

Gastonia. Arlington Cotton Mills; Cotton Yarns; built 2-story addition, 295 by 57 feet, brick; installed 10,000 spindles.

Gastonia. Flint Mfg. Company; Yarns; built new brick addition, 133 by 100 feet; installed 11,520 spindles and preparatory machinery.

Granite Falls. Granite Falls Mfg. Co.; Carpet Warps; installed new power equipment; built new dam.

Greensboro. Pomona Mills, Inc.; Shirtings and Yarns; installed 150 new automatic looms to replace old equipment.

Kannapolis. Cannon Mfg. Company; Sheetings, Towels, etc.; built new filter plant; built new addition to card room; installed new machinery.

King's Mountain. Pauline Mills; Table Damask; built new carding and spinning department to make yarns for the present weaving plant; installed 2,000 spindles.

Lexington. Erlanger Cotton Mills Co., Special Cloth for R. V. D. Underwear; built new addition to add 15,000 spindles and 400 looms, increasing equipment to 41,000 spindles and 1,100 looms.

Long Island. Long Island Cotton Mills; Cotton Yarns; improved water power; added cotton rope department; installed 1,000 spindles and twisting equipment.

Lowell. Lowell Cotton Mills; Yarns; installed new combing machinery.

Lumberton. Lumberton Cotton Mills; Hosiery Colored Yarns; remodeled dye-house; installed more equipment.

McAdenville. McAden Mills; Plaids and Denims; installed new power equipment.

Oxford. Oxford Cotton Mill Company; Yarns; changed from steam to electric power.

Raleigh. Raleigh Cotton Mills; Yarns; installed new winding machinery to replace old equipment.

Randleman. Deep River Mills, Inc.; Cheviots, Cotton Plaids and Seamless Grain Bags; built new weave room; installed 200 looms.

Spray. Thread Mills Co.; new 3,000 h. p. Central steam power plant; fine weaving mill for 500 box looms; wide sheeting mill for 1,000 looms at Draper.

Thomasville. Amazon Cotton Mills; Yarns; installed 21 new cards and 8 new combs; built new packing house.

Troy. Smitherman Cotton Mills; Domets, Skirtings and Ginghams; installed 180 new automatic looms to replace old equipment.

Wilmington. Delgado Cotton Mills Company; Ginghams, Ticks, Shirtings, etc.; built 2-story addition to be equipped for finishing.

Wilson. Wilson Cotton Mills; Warps; installed new power equipment.

Worthville. Riverside Mills, Inc.; Drills and Seamless Bags; increased equipment to 7,000 ring spindles and 248 looms; installed new power equipment.

Asheville. French Broad Mfg. Company; Crochet, Satin and Marseilles Quilts; built new spinning mill, 200 by 100 feet, 2 stories and basement; also new reinforced concrete storehouse, 100 by 50 feet, 4 stories high; built extension of present bleachery; installed 5,000 spindles; installed new finishing machinery.

Bessemer City. Gambrill & Melville Mills Co.; Cotton Goods; installed large amount of new machinery.

Caroleen. Henrietta Mills; Sheetings, Shirtings, Print Cloths, etc.; installed new automatic looms.

Charlotte. Charlotte Cotton Fibre Company; Mattress Felts and Rolled Batts;

rebuilt main structure; erected two warehouses.

Charlotte. Saxona Mfg. Company; Fancy Towels and Bureau Scarfs; built new 1-story mill, 200 by 128 feet; equipped plant for weaving fancy jacquard goods.

Cliffside. Cliffside Mills; Staple Ginghams; built 500-foot addition.

Coleridge. Enterprise Mfg. Co.; Carpet Warp Yarns; built new water power department; installed new machinery.

Concord. Young-Hartsell Mills Company; Damask and Yarns; built new addition; installed new carding machinery.

Worth. Harden Mfg. Co.; Cotton Yarns; rebuilding plant recently destroyed by fire.

Oklahoma, Guthrie. Pioneer Cotton Mills; Twine, Rope, Wicks, etc.; may install weaving and knitting departments.

Pennsylvania, Philadelphia. Bennett & Aspden Co.; Leverington Ave. and Baker St.; Manayunk; Upholstery Goods; building new 4-story main building, 64 by 225 feet; 1-story dyehouse, 119 by 48 feet, finishing building, 60 by 106 feet; a powerhouse, 40 by 50 feet.

Philadelphia. Boger & Crawford; Ontario and Janney Sts.; Mercerized Yarns; built new 2-story addition, 49 by 112 feet, brick, concrete and timber; installed new converting machinery.

Philadelphia. Cheltenham Towel Mills; Patrick McPeak, prop.; Turkish Towels and Terry Fabrics; took over more floor space; installed 12 new looms.

Philadelphia. Devlin, Charles; 3219 Kensington Ave.; Cotton and Woolen Waste; built new 2-story brick building, 40 by 100 feet, to replace one destroyed by fire.

Philadelphia. Gottschalk, John W. Mfg. Co.; Mascher Street and Lehigh Ave.; Tinsel Threads, Cordage, etc.; leased another floor in same building, increased equipment.

Philadelphia. Henry, Thos. & Sons Co., Inc.; Tioga Mills; Hosiery and Weaving Yarns; erected new 1-story brick building, 18 by 32 feet.

Philadelphia. Hughes, John H. Company; 2554 North 3d St.; Mercerized and Plain Cotton Yarns; installed new cone winders.

Philadelphia. Miller, Jacob, Sons & Company; 16th and Reed Sts.; installed 12 new looms.

Philadelphia. Niagara Thread Company; 120 South American Street; Sewing and Seaming Threads; building new 1-story brick building, 50 by 150 feet.

Philadelphia. Orinoka Mills; Ruth, Jasper and Somerset Streets; purchased the entire equipment of the Wentworth Mills.

Philadelphia. Philadelphia Tapestry Mills; Allegheny Ave. and Front St.; Upholstery Fabrics; erected new 5-story brick and concrete building, 60 by 243 feet.

Philadelphia. Porter Bros. Textile Company; Margaret and Ditman Sts.; Frankford; enlarged plants; installed number of new looms.

Philadelphia. Ripka Mills; Main Street; Cotton, Woolen and Worsted Dress Goods; installed new power equipment.

Philadelphia. Schadewald Mills; Third and Huntingdon Street; installed 25 new looms.

Philadelphia. United States Thread Company; 718 Cherry St.; Sewing Cotton and Mercerized Yarns; have moved to 241 Arch Street; quadrupled their equipment.

Philadelphia. Wolfenden, Crawshaw; Coners, Winders, Reelers, in Yarns; removing to larger building at Broad and Huntingdon Sts.

Reading. Bancroft, Joseph & Sons Co.; Holland Book Cloths; building new reinforced concrete and brick building, 3 stories high, 145 by 170 feet; also new picker house, 2 stories high, 53 by 105 feet.

Rhode Island, Albion. Valley Falls Company; Cotton Goods; re-equipped power department.

Anthony. Coventry Company; Fine Combed Goods; installed new twisting machinery and 8 new 50-spindle spinning frames; also 1,300 new warp spindles.

Centreville. Warwick Mills; Fine Goods, Plain and Fancy; installed 200 new looms.

Hope. The Hope Company; Sheetings and Shirtings; built new 1-story addition, 50 by 35 feet to the cotton warehouse; installed new machinery.

Howard. Hill & Lacross Company; Cotton, Mercerized and Silk Braids and Tapes; built new one-story addition, 27 by 83 feet.

Knightsville. Atlantic Tubing Company; Tubings of All Kinds Made to Order; built new 3-story addition, 24 by 29 feet, for office, manufacturing and drying purposes.

Lonsdale. Lonsdale Company; Fine Bleached Sheetings, Silesias, Hollands, etc.; replaced old style looms with new automatic ones.

Manville. Contrexville Mfg. Company; Plushes, Cotton and Silk Dress Goods; built new storehouse.

Pawtucket. Coats, J. & P., Inc.; Spool Cotton; overhauled entire equipment.

Pawtucket. Crown Mfg. Company; Yarns; built new picker house, 2 stories high, of mill construction; built new storehouse, 2 stories high and basement, reinforced concrete mushroom construction; will permit the addition of 5,000 spindles.

Pawtucket. Jenckes Spinning Company; Cotton, Mercerized and Novelty Yarns, Cotton, Silk and Tire Fabrics; new 2-story addition, 200 by 63 feet; new 3-story brick mill, 300 by 110 feet.

Pawtucket. Lorraine Mfg. Company; Cotton and Worsted Dress Goods, Shirtings, etc.; built new $12,000 addition to office building.

Pawtucket. Seekonk Lace Company; Laces; new 2-story addition, 100 by 50 feet, brick; installed 11 new lace machines.

Pawtucket. Shannock Narrow Fabric Co.; Featherstitched Braids and Mercerized Ribbons; installed 16 new automatic looms.

Pawtucket. Union Wadding Company; Wadding and Batting; built new 1-story addition, 110 by 180 feet, brick and steel.

Providence. Atlantic Tubing Company; Tubing; building new addition to the plant at Knightsville.

Providence. Coventry Company; Fine Combed Goods; installed 32 new spinning frames to replace old equipment.

West Barrington. Rhode Island Lace Works; Trimming Laces; built addition to boiler room; built smoke stack 35 feet higher.

Westerly. Westerly Textile Company; Nettings, Curtain and Special Fabrics; installed 36 new automatic looms.

Woonsocket. Globe Mill; Manville Co.; Sheetings, etc.; installed 100 new frames and 1,000 new looms to replace old equipment.

Woonsocket. Lawton Spinning Company; Threads, Fine Cotton Yarns, etc.; built new one-story addition, 117 by 59 feet; also three-story addition, 100 by 60 feet; installed 22,000 new spindles and preparatory machinery; installed new finishing equipment; increased capacity about 25 per cent.; increased capital stock to $2,400,000.

Woonsocket. Nyanza Mills; increased capital stock to $1,000,000; will build addition, 278 by 135 feet, 4 stories high; 2-story picker house, 121 by 100; 4-story addition to present storehouse, 100 by 68 feet; allowing space for 25,000 additional spindles.

Woonsocket. Ray, Edgar K. Est.; Carded Cotton and Waste; to build new 3-story brick mill, 380 feet long and 80 feet wide; consolidating old business in the new mill.

Woonsocket. Woonsocket Falls Mill; Plushes; building new brick dyehouse, 31 by 56 feet.

South Carolina, Anderson. Conneross Yarn Mill; Linter Rope and Mop Yarns, changed product to manufacturing of asbestos yarns; installed new machinery.

Anderson. Equinox Mill; Duck; built new addition, 72 feet long; rearranged present machinery; installed new equipment.

Blacksburg. Broad River Mills; Hosiery Yarns; increased capital stock to $100,000.

Great Falls. Republic Cotton Mills; Print Cloths; increased capital stock to $1,200,000; plans made for new 3-story reinforced concrete building, 400 by 133 feet; also new 2-story warehouse, 175 by 100 feet; also cottages for employes; to add 32,640 spindles and 740 looms.

Greenville. Parker Cotton Mills Company; main office moved from the Masonic Bldg. to the Monaghan Mills.

Greenwood. Panola Cotton Mills; Sheetings; increased capital stock to $500,000.

Kershaw. Kershaw Cotton Mills; Sheetings; installed 1,216 new additional spindles; also 28 automatic looms.

Orangeburg. Orangeburg Mfg. Company; Brown Sheetings; improved the power department.

Rock Hill. Arcade Cotton Mills; Print Cloths; installed new machinery in the weave room, replacing old equipment.

Rock Hill. Hamilton Carhartt Cotton Mills; Cottonades, Denims and Shirtings; purchased 125 looms from the Glenn-Lowry Mfg. Co., who are replacing their old equipment with machinery of different type.

Rock Hill. Victoria Cotton Mills; Staple Ginghams; installed 82 new looms.

Seneca. Monaghan Mills; Seneca Mill; installed new power equipment.

Union. Monarch Cotton Mills; Cotton Cloth; will add 11,000 spindles and more looms.

Whitmire. Glenn-Lowry Mfg. Company; Print Cloths; installed new automatic looms to replace old equipment.

Whitney. Whitney Mfg. Co.; Sheetings; built new addition; installed new machinery.

Williamstown. Williamstown Mills; Forty-inch Print Goods; installed 750 new automatic looms to replace old equipment.

Woodruff. Woodruff Cotton Mills; Print Cloth and Wide Goods; building new 4-story addition, 89 by 124 feet; installing 1,800 new spindles.

Tennessee, Covington. Tipton Cotton Mill; Sheetings; overhauled plant; made extensive improvements and changes.

Fayetteville. Elk Cotton Mills; Cotton Yarns, Warps and Skeins; to build new mill, 2 stories high, 150 by 125 feet; installing 5,000 new spindles; also increasing power department.

Humboldt. Humboldt Cotton Mills; Sheetings, Bag Goods and Yarns; increased capital stock to $200,000.

Knoxville. Brookside Mills; Corduroys, Velvets, Ducks, etc.; built new 2-story addition to cloth room.

Knoxville. Knoxville Spinning Company; Hosiery Yarns; increased capital stock to $100,000; installed 3,000 new spindles; may make further increases.

Shelbyville. Sylvan Cotton Mills; Osnaburgs and Duck; increased capital stock to $144,000; building new 6,000 spindle mill, 2 stories high, 224 by 76 feet.

Texas, Brenham. South Texas Cotton Mills; Sheetings; installed new spinning equipment.

Cuero. Guadalupe Valley Cotton Mills; Ducks; built new brick addition; installed 5 new cards; 4 spinning frames; 32 looms.

Dallas. Dallas Cotton Mills; Single Filling Duck and Drills; doubling picker room and installing new machinery in several departments.

Denison. Denison Cotton Mill Company; Cotton Duck, Sheetings and Drills; repaired plant; installed new spinning machinery.

McKinney. Texas Cotton Mill Company; Cheviots, Denims, Pin Checks, Awning Stripes; built new warehouse, 50 by 100 feet; installed 32 new box looms and 4 cards.

Post. Postex Cotton Mills; Bed Sheets and Pillow Cases; installed 104 new looms.

Waxahachie. Waxahachie Cotton Mills; Single Filled Duck; built new 1-story addition, 26 by 159 feet, and installed new cards and other equipment for making lines of heavier duck.

Vermont, Burlington. Queen City Cotton Company; Print Cloths, Odds, Sateens, Twills, Shirtings and Yarns; built new addition, 325 by 50 feet, 1 story high, brick, sawtooth roof; installed 126 new automatic looms.

Virginia, Danville. Riverside & Dan River Cotton Mills; Chambrays, Shirtings, Dress Ginghams, Sheetings, etc.; installed 350 automatic looms.

Lynchburg. Lynchburg Cotton Mill Co.; Sheetings, Osnaburgs, etc.; installed 1,100 new automatic looms to replace old equipment; also new heating system in the weave room; new slasher.

WOOLEN

Connecticut, Bridgeport. The Salt's Textile Mfg. Co.; Plushes, Velvets, Imitation Furs, Astrachans; increased capital stock to $3,000,000; enlargements and improvements in plant.

Killingly. Assawaga Co.; installed a new 600 h.p. engine, doubling power capacity.

Norwich. Hall Bros.; Dress Goods and Cloakings; building new 1-story brick dyehouse, 40 by 72 feet; a new brick boiler house; a 2-story brick building, 130 by 50 feet; will install two new 180 h.p. boilers.

Putnam. Putnam Woolen Co.; installed new boilers and electric power equipment.

Stafford Springs. Cyril Johnson Woolen Co.; installed new finishing machinery.

Stafford Springs. Rhode Island Worsted Co.; built addition, 42 by 59 feet; increased dyeing and finishing departments.

Staffordville. Fabyan Woolen Co.; erected a 3-story brick addition to the company's mill at Staffordville.

Thompsonville. Bigelow-Hartford Carpet Co.; added 12 sets of cards in yarn department; also looms in Brussels weaving department; plans prepared for two new mills.

Indiana, La Porte. La Porte Woolen Mills; Men's Wear and Ladies' Dress Goods; installed water softening plant, with capacity of 50,000 gallons per hour.

Mishawaka. Mishawaka Woolen Mfg. Co.; built large additions to enlarge rubber department.

Seymour. Seymour Woolen Factory Co.; All Wool Blankets, Shirtings, Dress and Skirting Flannels; built new dyehouse and wet finishing room, 2 stories high, 163 feet long; new weave shed, 88 by 152 feet, sawtooth roof.

Iowa, Nashua. Nashua Woolen Mills; built new dyehouse; installed automatic wool washer, dryers and machinery for dyeing yarns, raw stock and piece goods.

Kentucky, Louisville. Sterling Spinning Co.; Knitting Yarns; installed winding machinery.

Mayfield. Mayfield Woolen Mills; Cassimeres; installed cards and spinning equipment.

Maine, Bridgton. Forest Mills (American Woolen Co.); Fancy Woolens; enlarged boiler house; installed new machinery.

Fairfield. Kennebec Mills (American Woolen Co.); installed new power equipment; installed new cards to replace old equipment.

Old Town. Old Town Woolen Co.; Cassimeres and Overcoatings; erected new storehouse, 30 by 70 feet.

Sanford. Goodall Worsted Co.; Yarns, Dress Goods, etc.; built new dyehouse, 187 by 89 feet, 3 stories high, brick; new weave shed, 150 by 80 feet, 2 stories high, sawtooth roof; installed 100 new looms; increased capital stock to $1,850,000.

Sanford. Sanford Mills; Robes, Blankets, etc.; building new mill, 3 stories high, 135 by 169 feet; new mill, 374 by 60 feet, 4 stories high; new machine shop and power station.

Waterville. Wyandotte Worsted Co.; Woolens and Worsteds; installed four 60-inch cards; four 360-spindle mules; erected new dyeing department.

Wilton. Wilton Woolen Co.; Cashmerettes; installed new looms.

Massachusetts, Ballard Vale. Ballard Vale Mills Co.; White Flannels; improved water power equipment.

Cherry Valley. Valley Woolen Mill; Flannels and Dress Goods; building new dyehouse.

Clinton. Bigelow-Hartford Carpet Co.; building new 3-story mill, 119 by 141 feet; added 100 looms and other machinery.

Clinton. Burton Co.; Wool Stock and Yarns; remodeled and re-equipped Victor Mill.

Franklin. Clark - Cutler - McDermott Co.; Horse Blankets; erected new addition, 100 feet long, for storage and manufacturing purposes.

Globe Village. Hamilton Woolen Co.; Cashmeres and Worsted Novelties; built brick addition, 4 stories high; to increase power plant.

Holden. Holden Woolen Co.; $25,000; Frank H. Viele, 184 Summer St., Boston, pres. and treas.; S. F. Sheedon, supt.; Patrick H. Walsh, clerk; Woolens; took over old Dawson Mill.

Jefferson. Jefferson Mfg. Co.; Cheviots and Cassimeres; installed 16 new broad looms.

Lawrence. Monomac Spinning Co. (William Whitman & Co.); Merino Yarns; building addition; to increase to 40,000 spindles.

Leicester. Leicester Woolen Co.; erected new dyehouse and finishing room, 45 feet long, 45 feet wide and 16 feet high; a bleachery, 1 story high, 15 by 25 feet.

Lowell. Lyon Carpet Co.; Carpets, Rugs, etc.; erected addition, 33 by 60 feet, 3 stories high; also 2-story annex, with 7,000 square feet of floor space; added 30 looms.

Maynard. Assabet Mills (American Woolen Co.); installed 3 new sets of cards, and will add 18 more sets.

Medway. Fabyan Woolen Co.; Flannel Shirtings, Dress Goods, etc.; installed new machinery and electric motors.

Millbury. Mayo Woolen Co.; Cassimeres, Dress Goods, etc.; installed 2 sets of cards and 4 mules (equipment purchased from Ramshorn Mill at West Millbury); installed electric motor.

Millbury. Millbury Spinning Co.; Worsted Yarns; building new 3-story addition; wood construction.

Newton Lower Falls. Sullivan, R. T.; Shoddy and Extracts; installed new machinery.

North Andover. Brightwood Mfg. Co.; Worsted Dress Goods; increased capital stock to $300,000.

Rochdale. Carlton, E. G. & Sons; White Flannels; built new bleach house.

Saugus. Iroquois Mills; Worsted and Woolen Fabrics; installed 16 new woolen mules; overhauled plant.

Smith's. Swift River Mill; Fancy Cassimeres; leased by the Wyman Castle Mills, Inc.

South Acton. South Acton Woolen Co.; Shoddies and Extracts; building 1-story addition, 24 by 50 feet, to dyehouse.

South Royalston. Royalston Mill (American Woolen Co.); made extensive repairs about the plant.

Taunton. New England Cotton Yarn Co.; Yarns; installed new mercerizing machinery.

Uxbridge. Uxbridge Worsted Co.; Piece Dyes and Cotton Worsteds; built an addition, 1 story high, 48 by 50 feet, to the dyehouse.

Uxbridge. Hecla Mill (American Woolen Co.); built an addition to enlarge the capacity of the finishing department.

Warren. Sayles & Jenks Mfg. Co.; Cassimeres; installed 20 new looms.

Watertown. Chase, L. C. & Co.; Horse Blankets; installed two new looms and warping and winding machinery.

Webster. Perry, Josiah Woolen Mill; Cassimeres; built new steel and concrete flume; plant overhauled.

West Stoughton. French & Ward; Woolens, Elderdowns, etc.; installed new machinery and other equipment.

Worcester. Worcester Woolen Mill Co.; Kerseys, Meltons, Thibets, Uniform Cloth; building new 4-story reinforced concrete addition, 106 by 68 feet, to picking department.

Michigan, Eaton Rapids. Eaton Rapids Woolen Mills; Horner Bros.; erected new 2-story addition, 70 by 50 feet; also office building, 3 stories high, 50 by 125 feet.

New Hampshire, Franklin. Franklin Mills; Broadcloths, Dress Goods, etc.; installed new power equipment.

Franklin. Sulloway Mills; Underwear; built new yarn mill, 2 stories high, 57 by 31 feet, brick; also another new building; installed a box department for making boxes for company's hosiery; built new brick office building; installed 5 sets of 60-inch cards and 8 320-spindle mules.

Penacook. Harris, Emery, Co.; Broadcloths, Dress Goods, etc.; building new addition to provide for installation of 660 new spindles and one new set of woolen cards.

Rochester. Rochester Woolen Co.; Dress Goods; installed six new looms to replace old equipment.

West Swanzey. Homestead Woolen Mills; H. W. Brown, prop.; Flannels; installed new looms.

New Jersey, Camden. Eavenson & Levering; Wool Scourers and Combers; will build two large additions, one 111 by 168 feet, and the other 64 by 82 feet, of brick and concrete, the larger to be used for combing, and the other for storage purposes.

Garfield. Forstmann & Huffmann Co.; Fine Worsteds, Broadcloth, Novelties; building new storage and finishing mill, 4 stories and basement, to increase woolen yarn department.

Hightstown. Hightstown Smyrna Rug Co.; Carpets, Rugs, Mats, etc.; built addition, 3 stories high, 50 by 100 feet; installed 15 new Axminster rug looms; installed new power equipment.

Newark. Basch & Greenfield Co.; Wool Fiber, Shoddy, Flocks, etc.; built new 2-story picker building, 45 by 100 feet; installed sprinkler system; also new machinery; installed eight shoddy pickers.

Passaic. Forstmann & Huffmann Co.; Broadcloths, Novelties, etc.; built new addition, 5 stories high, 54 by 280 feet; reinforced concrete interior, brick and limestone walls and architectural terra cotta front, for office, shipping and warehouse purposes.

Passaic. Botany Worsted Mills; Worsted and Woolen Dress Goods; built new 2-story addition, 194 by 134 feet; installed new weaving machinery.

Paterson. Berlin Shawl Co.; Honeycomb and Silk Shawls; installed 18 new broad silk looms.

New York, Amsterdam. McCleary, Wallin & Crouse, Inc.; building addition, 270 by 78 feet, on Smyrna Rug mill.

Amsterdam. Shuttleworth Bros. Co.; Rugs and Carpets; built mill, 240 by 62 feet, 6 stories high; also new mill, 160 by 50 feet, 6 stories high, increasing capacity 50 per cent.; erected new machine shop; built addition to boiler and engine room.

Auburn. Auburn Woolen Co.; Woolens; built 3-story extension to plant; installed 3 new boilers, 4 new mules and 2 new cards.

Auburn. Nye & Wait-Kilmarnock Corp.; Woolen Rugs and Carpets; erected new mill and storehouse.

Falconer. Ferncliff Worsted Mills (Cleveland Worsted Mills Co.); replaced old equipment with new; increased capacity 40 per cent.; total number of spindles is 10,000.

Gloversville. Parkhurst, E. S. & Co.; Shoddy; built new 2-story addition, 42 by 200 feet; installed new equipment.

Jamestown. Odsonia Worsted Mills (Cleveland Worsted Co., Cleveland, Ohio); built new dyehouse, 236 by 60 feet, 1 story high; increased capacity 150 per cent.

Oriskany. Waterbury, H. & Sons Co.; Paper Makers' Felts and Blankets; built new mill with concrete foundation to replace old mill.

Rochester. Allen Woolen Mills; Suitings and Overcoatings; installed new power equipment to replace the old; overhauled plant.

Watertown. Wool Products Co., Inc.; installed new machinery; added the manufacture of automobile robes.

Watervliet. Roy Woolen Co.; purchased and started up idle factory building at 500 Broadway.

North Carolina, Elkin. Chatham Mfg. Co.; Blankets; building new brick storage building; making other improvements.

Ohio, Cleveland. Cleveland Worsted Mills Co.; Worsted Cloth and Yarn; built addition, 1 story high, 175 by 75 feet, for dyeing purposes; new storehouse, 2 stories high, 164 by 119 feet.

Oregon, Eugene. Eugene Woolen Mills; Flannels, Tweeds, Robes, etc.; built new dyehouse; built new floor in main mill.

Pennsylvania, Philadelphia. Baker, A. T. & Co.; Plushes, Corduroys and Velvets; will erect new 5-story reinforced concrete mill, 70 by 210 feet, and a 1-story and basement structure of brick and concrete, 82 by 42 feet, to be used as a boiler room.

Philadelphia. Bush & Terry; Axminster Rugs; built brick third story addition, 21 by 18 feet.

Philadelphia. Cameron, A. J. Co.; Worsted Yarns; building new 1-story brick addition; altering power house.

Philadelphia. Dobson, J. & J.; 26 N. Front St.; Woolen and Worsted Goods, Carpets; will erect 2-story concrete building, 20 by 20 feet, at Ridge Ave. and Crawford St.

Philadelphia. Dobson, John & James, Inc.; 8th and Somerset Sts.; Worsted Yarns; built new 4-story brick and stone building, 193 by 82 feet, to be used as a warehouse.

Philadelphia. Fletsher, S. B. & B. W., Inc.; Worsted Yarns; building new plant, 400 feet long, brick and concrete construction.

Philadelphia. Gebauer, Julius A.; Unity and Leiper Sts.; Cotton, Worsted and Mixed Men's Wear; building new 1-story building, 100 by 124 feet, containing about 15,000 square feet of floor space.

Philadelphia. Krock, Robert; Main St.; building new 1-story reinforced concrete building, 30 by 62 feet.

Philadelphia. Manayunk Yarn Co.; 4050 Main St., Manayunk; Woolen Carpet Yarns and Railroad Waste; built new 2-story brick building, 45 by 97 feet.

Philadelphia. Lincord Rug Co., Inc.; Jasper and Orleans Sts.; taken more floor space and installed 12 new 72-inch looms.

Philadelphia. Myers-Jolesch Co., Inc.; Howard and Montgomery Sts.; increased equipment to 30 looms.

Philadelphia. Walker & Stine; Leiper and Adams Sts.; Men's Wear, Couch Pillow Covers and Dress Goods; built new 4-story concrete building, 113 by 58 feet; installing 44 new looms.

Philadelphia. Walther, Louis, Mfg. Co.; Indiana Ave. and A St.; Men's Wear and Dress Goods; new building of stone and concrete; 3 stories high, with basement, 224 by 62 feet, at Torresdale Ave. and N St.; also leased portion of Emsley Mills for an annex; installed additional equipment.

Bridgeport. Energetic Worsted Mills; Worsted Yarns for Weaving and Knitting; increased equipment to 1,600 spindles.

Chester. Thurlow Worsted Mills; Fred Wolstenholme, prop.; Worsted Yarns; built new 60-foot steel and concrete tower, new water tank and other additions and improvements.

Parkers Landing. Parker Woolen Mills; Woolen and Merino Yarns; installed new winding department and added new cone winders.

Wallingford. Columbia Worsted Co.; Dress Goods and Worsted Yarns; taken over by the P. McGraw Wool Co., of Pittsburgh.

Rhode Island, Bridgeton. Premier Worsted Mills; Fancy Worsteds for Men's Wear, installed new power equipment and number of new looms.

Centredale. Centredale Worsted Mills; Worsted Yarns; equipped for reeling and spooling floor formerly used for storage; installed new drawing machinery; improved power department; overhauled plant.

Glendale. Orrell Mills, Inc.; Fancy Worsteds, Overcoatings, etc.; building 2-story addition, 72 by 56 feet, to increase carding and spinning departments.

Lymansville. Lymansville Co.; Worsteds, Cheviots, Worsted Yarns; repair power equipment and thoroughly overhauled plant.

Pawtucket. Goff, D. & Sons; Worsted and Cotton Braids, Mohair, Serge and Alpaca Linings, etc.; building new dyehouse.

Providence. Continental Worsted Co.; Olneyville; Fancy Worsteds for Men's Wear; took over the Greenville Mill and will operate it as a branch.

Westerly. Pawcatuck Woolen Mills; Men's Fancy Woolen Suitings and Overcoatings; installed 2 new spinning mules; also carding machinery to increase the capacity of the card room and finishing room.

Woonsocket. Falls Yarn Mills; Woolen, Merino, Cotton and Silk Noil Yarns; installed two new mules.

Woonsocket. Lippitt Woolen Co., Inc.; Cassimeres, Worsteds, Rain Cloths, Woolens, etc.; installed worsted spinning plant, 2,000 spinning spindles and drawing machinery; repaired power department.

Vermont, Ludlow. Agan, F. W.; Shoddy and Wool Extracts; repaired plant; installed new power department; installed new cement floor in basement of main building.

Northfield. Davis, Chas. M. & Co.; White Flannels; installed new power equipment.

Springfield. Slack, John T. Corp.; Wool Shoddies, Extracts and Flocks; built new addition, 350 by 57 feet, brick and cement, for use as a picking and assorting department; increased equipment to 49 cards and 42 pickers.

Virginia, Winchester. Virginia Woolen Co.; Flannels, Cassimeres, Velours and Cheviots; installed new power equipment; erecting new power room.

Washington, Washougal. Union Woolen Mills; Woolen Yarns and Cloth; purchased by the Pendleton Woolen Mills; built extensions to buildings and equipment.

Wisconsin, Baraboo. Island Woolen Co.; Woolen Goods for Men's Wear; built new addition, 4 stories high, 48 by 54 feet.

Milwaukee. Barnett, I. & Son; Wool Extracts and Shoddy; installed three new 60-inch modern shoddy cards; also pickers, doubling the plant's present capacity.

West Bend. West Bend Woolen Mill; Blankets, Batting, Mackinaws, etc.; built new addition, 44 by 70 feet, for dyehouse, picker room, engine and boiler room; also erected addition, 56 by 100 feet, for carding, spinning and weaving.

Canada, Ontario, Arnprior. Arnprior Felt Co., Ltd.; Felts for Paper and Pulp Mills; installed new knitting machinery for making heavy wool socks.

Ontario, Chesley. Chesley Woolen Mills Co.; Heavy, Coarse Tweeds, Blankets, Socks, etc.; installed new knitting equipment.

Ontario, Dundas. Mercury Mills, Ltd.; Carded Woolen Yarns; installed new carding equipment.

Ontario, Merrickville. Watchorn & Co., Ltd.; Tweeds, Flannels, Sheetings, Horse Blankets, etc.; built new dam and power house.

Ontario, Thorold. Penmans, Ltd.; Ribbed Underwear; established a hosiery mill in connection with the underwear mill in Thorold.

KNIT

Connecticut, Hartford. The Lion Mills; purchased the equipment of the Coronet Knitting Co. of Norwich.

Winsted. Winsted Hosiery Co.; Men's Flat Underwear; will build 2-story addition, 48 by 64 feet.

Georgia, Columbus. Georgia Mfg. Co.; built $8,000 addition; enlarged dyeing department and opening room.

Columbus. Perkins Hosiery Mills; increased capital stock to $300,000; erected central power plant; built new bleaching department.

Rome. Rome Hosiery Mills; High-Grade Seamless Hosiery; erecting new building, 36 by 100 feet, for dyeing department.

Illinois, Chicago. Bauer & Black; Surgical and Athletic Goods and Absorbent Cotton; increased facilities for bleaching absorbent cotton.

Chicago. Burkland Knitting Works; Infants' and Children's Underwear; built new 4-story and basement mill, 50 by 109 feet, at Wabansia Ave., increasing equipment; added new bleaching department.

Chicago. Vassar Swiss Underwear Co.; Ribbed and Full Fashioned Underwear and Union Suits; increased capital stock to $750,000.

Chicago. Western Shade Cloth Co.; built new factory building, corner of Jefferson and 21st Sts.

Fairfield. Sexton Mfg. Co.; Webbings, Ribbed Goods for Seams for Jean Drawers; built concrete warehouse, 160 by 125 feet; a building for packing and shipping, 50 by 175 feet; recreation hall for employes; installed complete sprinkler system; new sewing machines and presses.

Indiana, Fort Wayne. B. & B. Knitting Co.; Sweaters and Athletic Goods; will erect new brick building, 40 by 20 feet, 2 stories and basement.

Fort Wayne. Thieme Bros. Co.; Men's and Women's Full Fashioned Silk Hosiery; equipped machine shop for repair work; installed machinery.

Fort Wayne. Wayne Knitting Mills, Inc.; Cotton, Worsted and Silk Hosiery for Men, Women and Children; installed new bleaching equipment.

Goshen. Rock Run Mills; Wool and Worsted Ribbed Union Suits; increased capital stock to $100,000; installed new washing machinery; additional knitting and sewing equipment; Frank E. Miller, 346 Broadway, N. Y., is selling agent.

Maine, Lewiston. Laurendeau Bros.; Woolen Stockings; installed new machinery.

Massachusetts, East Douglas. Tally-Ho Knitting Co.; Shaker Sweaters; installed new equipment; added manufacture of line of silk sweaters.

Lowell. Lowell Hosiery Co.; Cotton and Silk Hosiery; installed new finishing machinery.

Malden. Malden Knitting Mills; Sweaters, Bathing Suits, etc.; erected addition, 4 stories high, 40 by 150 feet; installed new winding, knitting and finishing machinery, doubling output.

Waltham. American Knitting Co.; Sweaters, Jerseys and Bathing Suits; leased new building and greatly increased their capacity and output.

Michigan, Detroit. Oakland Knitting Co.; Worsted Gloves; increased capital stock to $15,000.

Grand Rapids. Star Knitting Works; Samuel S. Walker, prop.; installed new machinery and automatic sprinkler system.

Grand Rapids. Sanitary Knitting Co.; Order Underwear; erected addition to increase output.

Muskegon. Muskegon Knitting Mills; Hosiery; added woolen batting department.

Port Huron. Fead, John L. & Sons, Inc.; Mittens, Hosiery, etc.; installed 20 new knitting machines; also automatic fire sprinkler system.

Missouri, Kansas City. Goodenow-Brookfield Knitting Co.; Nainsook Underwear, Sweaters, etc.; increased capital stock to $125,000.

New Hampshire, Ashland. Ashland Knitting Co.; Hosiery; built new power plant.

Belmont. Ipswich Mills; Hosiery; installed new power equipment.

Franklin. Sullowav Mills; Hosiery; built new 2-story office building, 52 by 34 feet, brick; also new yarn mill, 3 stories, 76 by 165 feet, adding 5 sets of 60-inch cards and 8 320-spindle mules.

New Jersey, Belvidere. Allen, John E.; Hosiery; installed new machinery.

Boonton. Boonton Hosiery Co., Inc.; Increased capital stock to $150,000; built addition, 4 stories high, 44 by 58 feet; added one story to present mill; installed 26 knitting and 20 sewing machines.

Gloucester. Weisbach Co.; Gas Mantles; built four new reinforced concrete buildings, each 3 stories high; main structures consist of two buildings, one 300 by 80 feet, the other 70 by 60 feet, with two wings, 70 by 120 feet each.

Newark. Essex Knitting Mills; Sweater Coats, Hockeys, etc.; installed new knitting and finishing machinery.

New York, Clinton. Clinton Knitting Co.; Worsted Sweater Coats; building addition, 40 by 100 feet, to be used as a warehouse.

Fonda. Fonda Glove Lining Co.; Astrachans, Stockinet, Elderdowns, etc.; built addition, including offices, 3 stories high, 55 by 70 feet; also storehouse, 2 stories high, 32 by 165 feet.

Fulton. Spanswick, Wm. H. Mfg. Co.; Underwear and Union Suits; built new storehouse and boiler house.

Herkimer. Union Mills, Inc.; Gem Department; Women's and Children's Ribbed Cotton and Worsted Underwear; built new addition, 90 by 20 feet; installed new power equipment.

Hornell. Merrill Silk Co.; Silk Fabric Gloves; building large addition.

Johnstown. Royal Knitting Co.; Gloves and Mittens; built addition to plant, 90 by 20 feet; increased power equipment.

Kinderhook. Kinderhook Knitting Co.; Sweaters, Gloves, Caps, Toques, etc.; replaced hand machines with power machines.

Mechanicsville. Union Mills; Sagamore Department; built new addition; installed 40 new knitting machines.

Medford. Medford Knitting Mills; Sweaters; installing new knitting machinery.

New York City. Bruck Knitting Mills, Inc.; Sweaters, Sweater Coats, Infants' Goods and Fancy Knit Goods; increased equipment to 45 flat and links-links machines and 18 sewing machines.

New York City. Northern Knitting Mills; Sweaters and Fancy Knit Goods; leased additional space, increasing capacity.

Oswego. Chouaguen Textile Mills; Children's Knit Goods; building 2-story addition, 60 by 30 feet, increasing output.

Sherburne. Canasawacta Knitting Co.; Underwear, Bathing Suits, etc.; installed new power equipment.

Utica. Mohawk Valley Cap Factory; Cardigans, Toques, Caps, etc.; built new bleach house, 50 by 123 feet, 2 stories high, brick construction.

Utica. Oneita Knitting Mills, Inc.; Underwear; built another story, 270 by 110 feet, on Mill No. 4; installing new knitting machinery.

Whitesboro. Ablett, Robert & Co., Inc.; Cotton Underwear and Union Suits; built new 3-story warehouse, 130 by 50 feet, to increase production.

North Carolina, Ashboro. Acme Hosiery Mills; Women's Seamless Hosiery; built new 2-story brick building, 100 by 60 feet; installed 100 knitting machines and electric motors.

Burlington. Sellers' Hosiery Mills; Men's Seamless Half Hose; built new 2-story addition, 70 by 50 feet, for installing a new dyeing and finishing plant.

Hickory. Elliott Knitting Mills, Inc.; Women's and Infants' Hosiery; built new 2-story building, 75 by 75 feet; installed 24 new knitting machines.

Newton. Ridgeview Hosiery Mill; Seamless Hosiery; installed 40 new knitting machines.

Tarboro. Runnymede Mills, No. 2; Men's Half Hose; increased capital stock; will make some additions.

Zebulon. Zebulon Hosiery Mills; Half Hose; built new dyehouse; installed new bleaching plant.

Ohio, Cleveland. Rich, N. J. & Co.; Fleece Linings, Jerseys, Sweater Coats, etc.; incorporated, with capital stock of $500,000; installed new machinery.

Pennsylvania, Philadelphia. Alberta Knitting Mills; S. M. Witz, prop.; Bathing Suits and Jerseys; rented new addition and will enlarge plant.

Philadelphia. Bannister, George & Co.; 5155 Wakefield St., Germantown; Fancy Knit Goods, Skirts, etc.; installed six new Tricot machines for making silk fabrics for gloves.

Philadelphia. Brownhill & Kramer; Men's and Women's Hosiery; purchased lot of land and will erect new 2-story brick mill as addition to present plant.

Philadelphia. Cope Knitting Mills; Pastorius and Osceola Sts., Germantown; Ribbed Cotton Underwear; plant bought by Alberta Knitting Mills, S. M. Witz, prop.; name changed to Climax Bathing Suit Co.

Philadelphia. Hadfield Hosiery Co.; Kensington Ave. and Huntingdon St.; Children's and Infants' Cotton and Mercerized Hosiery; installed new machinery for making fashioned goods.

Philadelphia. Nickels & Lauber Knitting Co.; Marshall and Spring Garden Sts.; installed new machinery for manufacturing silk and art. silk sweater coats.

Philadelphia. Novelty Knitting Mills; Feld & Co.; purchased entire equipment of the Alphia Knitting Mills.

Philadelphia. Payne, C. W., Hosiery Co.; Hancock and Somerset Sts.; Seamless Cotton Hosiery; removed equipment to 2420 Waterloo St.

Philadelphia. Pioneer Knitting Co.; 40 North 3rd St.; Children's and Infants' hand knit goods; moved their plant to 19 South 4th St.

Philadelphia. Querns Brothers; 1916 North 4th St.; Women's and Misses' Knitted Underwear; built new 5-story building.

Annville. Kreider, A. R. & Bro.; Seamless Hosiery; building 3-story addition to plant; adding dyeing department.

Bangor. Sterling Silk Glove Co.; Silk Gloves, Underwear and Mittens; built new 3-story addition; also leased another building; increased equipment to 11 knitting looms and 190 sewing machines.

Bloomsburg. Bloomsburg Hosiery Mills; Women's and Infants' Hosiery; installed 10 new knitting machines.

Boyertown. United Underwear Mill; Children's Underwear and Union Suits; building new mill 32 by 60 feet into which they will move their present plant.

Dover. Dover Hosiery Mill; D. S. Brillhart, prop.; Seamless Half Hose; built new addition, 20 by 25 feet; installed new knitting machinery.

Ephrata. Moyer, Walter, W.; Women's and Children's Ribbed Underwear; built new 4-story addition; installed fire sprinkler system.

Harrisburg. Moorhead Knitting Co.; Men's and Women's Cotton and Silk Hosiery; increased capital stock to $150,000.

Harrisburg. New Idea Hosiery Co.; Men's and Women's Seamless Hosiery; installed new additional machinery.

Lebanon. Kreider, A. R. & Bro.; Hosiery, doubling capacity of plant.

Lykens. Keene & Knilley; Cotton Half Hose; will build large addition.

Lykens. Lykens Knitting & Mfg. Co.; Cotton Hosiery; installed 16 new knitting machines.

Meadville. Meadville Knitting Mills; Hosiery; increased capital stock to $40,000.

Mifflintown. Juniata Hosiery Mills; Ladies' Hosiery; built new addition; increased equipment 50 per cent.; installed 30 new knitting machines.

Milton. West Branch Knitting Co.; Men's Underwear and Hosiery; installed the entire plant of the Suffolk (Va.) Hosiery Mill; increased capacity to 800 dozen of hose per day.

Mohrsville. Wagner, James H., & Co.; Ladies' Ribbed Cotton Underwear; installed new equipment.

Newcastle. Newcastle Knitting Mills; Men's and Women's Cotton Hosiery; increased the capacity of their bleaching department; installed new knitting machinery.

Norristown. Ballard Knitting Mills; Underwear, Sweaters, Webbing and Anklets; built new 5-story plant, 60 by 120 feet; also powerhouse and office building; increased capacity 50 per cent.

Phoenixville. Watco Knitting Co.; Women's Ribbed Underwear; moved equipment from Downington to new plant, also installed new machinery.

Pottstown. Century Knitting Co.; Ladies' Ribbed Underwear; building new addition to increase capacity one third.

Pottsville. Keystone Knitting Mills; Ladies' Ribbed Underwear; installed 8 new knitting machines and 8 sewing machines.

Reading. Berkshire Knitting Mills; Women's Full Fashioned and Mercerized Silk Hosiery; built new 5-story mill, 240 feet long.

Reading. Hahn, Harry; Hosiery; installed 25 new knitting machines.

Reading. Heff-Worth Knitting Mill; P. O. Address, West Reading; Women's Light Weight Cotton Underwear; built additional story on plant.

Reading. Oakbrook Hosiery Mill; Oakbrook; Women's Seamless Silk Hosiery; added 36 new machines.

Roxbury. Shippensburg Knitting Co.; Shippensburg; established branch plant.

Schuylkill Haven. Coldren Knitting Mills; Women's and Children's Cotton Ribbed Underwear; built enlargement to plant, 70 by 36 feet.

Shamokin. Shamokin Knitting Mills; Seamless Cotton and Ribbed Hosiery; increased capital stock to $150,000.

Souderton. Bergey, M. B., & Co.; Seamless Hosiery and Half Hose; installed 50 new 176-needle knitters for making split foot hosiery.

Spring Grove. Pennsylvania Knitting Mills Co.; Children's and Infants' Cotton Hosiery; installed large amount of new equipment.

Yorkhaven. Unrivalled Hosiery Mill, Inc.; adding machinery to almost double capacity.

Rhode Island, Central Falls. Blackstone Stocking Co.; Wool, Worsted and Merino Hosiery; built new storehouse to replace one recently destroyed by fire.

South Carolina, Union. Gault Mfg. Co.; Seamless Hosiery; built new finishing room.

Tennessee, Harriman. Harriman Hosiery

Starches, Gums, Dextrines, Sago, Tapioca, etc.

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SEND FOR BOOKLET—"THE YELLOW PERIL"

U. S. GUTTA PERCHA PAINT CO.
20 Dudley Street
Providence, R. I.

Mills; Women's Cotton Hosiery; installed 15 new knitting machines.

So. Pittsburg. Aycock Hosiery Mills; building addition to dyehouse, 1 story high, 50 by 40 feet; will install new machinery.

Vermont, Bennington. Bennington Hosiery Co.; Worsted and Merino Hosiery; will install new machinery.

Virginia, Norfolk. Sloane, Wm. & Co.; Men's Fleeced Lined Underwear; will install additional knitting machinery and change over from steam to electric power.

Suffolk. Suffolk Knitting Mills, Inc.; Hosiery; built new brick addition, 210 by 40 feet.

Washington, Olympia. Olympia Knitting Mills, Inc,; sweater Coats and Fancy Knit Goods; installed new equipment.

Wisconsin, Appleton. Fox River Valley Knitting Co.; Half Hose, Lumbermen's Socks, and Mittens; built new drying department; installed 15 new machines.

Kenosha. Cooper Underwear Co.; Union Suits; addition comprising 75,000 square feet of floor space, for new men's hosiery department.

Milwaukee. Phoenix Ktg. Works, Inc.; Men's and Women's Seamless and Full Fashioned Hosiery; new 6-story and basement mill, 60 by 120 feet, at Milwaukee and Chicago Sts., to increase its manufacturing facilities.

Sheboygan. Hand Knit Hosiery Co.; Seamless Hosiery, Socks and Mittens; built new 2-story and basement warehouse and office building.

Canada, Newfoundland. St. Johns. Newfoundland Knitting Mills, Ltd.; Underwear and Union Suits; installing new machinery for making men's heavy woolen hose.

Ontario, Arnprior. Arnprior Felt Co., Ltd.; Felts; installed new knitting machines for making heavy wool socks.

Ontario, Brantford. Niagara Silk Mills, Ltd.; Silk Gloves, Underwear and Hosiery; built new dyehouses.

Ontario, Guelph. Colonial Knitting Co., Ltd.; Sweaters and Fancy Knit Goods; rebuilding plant destroyed by fire; installing 35 knitting machines, dyeing equipment, and electric power equipment.

Ontario, Hamilton. Mercury Mills, Ltd.; Hosiery; building new $250,000 plant.

Ontario, Hespeler. Schaus & McTearnan; Hosiery; moved into larger quarters; installed new machinery.

Ontario, Woodstock. Oxford Knitting Co., Ltd.; Cotton, Wool, and Silk Underwear; installed new finishing and drying machinery.

SILK

Connecticut, Danbury. Imperial Silk Works; Hat Bands, Braids and Cords; adding more looms.

Middletown. Portland Silk Co.; added 36 new box looms.

Mystic. The Mystic Industrial Co.; owners of the mill occupied by the Rossie Velvet Company are building an addition to the plant for the use of the dyeing department.

Norwalk. Muller Gloria Mills; Umbrella Silks and Dress Goods; building addition to dyehouse.

Norwich. Schwarzenbach, Huber Co.; Broad Silks; added new looms, increasing equipment to 200 looms.

South Manchester. Cheney Bros.; added new spinning equipment; consolidated weaving departments.

Stonington. American Velvet Co.; Silk Velvets; building new storehouse.

Watertown. Hemingway & Bartlett Silk Co.; erecting addition.

Missouri, St. Louis. Lowell Bleachery; Dye and Finish Shoe Linings; building larger plant.

New Hampshire, Keene. Keene Artistic Narrow Web Co.; Trimmings; installed 50 new looms; increasing all departments.

New Jersey, Paterson. American Silk Mills, Inc.; leased additional space and will install 60 more looms.

Paterson. Audiger & Meyer Silk Co.; Tie and Dress Silks; installed 48 new broad silk looms.

Paterson. Century Silk Mfg. Co.; Broad Silks; installed 4 new looms.

Paterson. Commercial Silk Co.; Broad Silks; purchased plant at 130 Broadway; installed 12 broad silk looms.

Paterson. Cohen, Abraham D.; Broad Silks; installed 30 broad looms.

Paterson. Diamond Silk Company; Dress Silks; installed 20 new broad silk looms.

Paterson. Imperial Silk Co.; Broad Silks; installed 24 looms.

Paterson. Jansen & Pretzfeld; Broad Silks, etc.; replaced narrow looms with wider ones.

Paterson. Margolin & Baten; Broad Silks; increased equipment to 50 looms; leased more space in same building.

Paterson. Nobles Textile Co.; Broad Silks; increased their equipment.

Paterson. Oriental Silk Printing Co.; Silk Warps, Draperies, etc.; built new color shop in Haledon, 50 by 200 feet.

Paterson. Pelgram & Meyer; Broad Silks and Ribbons; overhauled and improved plant.

Paterson. Sterling Ribbon Co.; Ribbons; adding 50 broad silk looms, and will make a further installation later.

Philipsburg. Reynolds & Tirrell; Broad Crepe Silks; built new addition, 99 by 130 feet; installed 5,000 spindles and 50 looms.

Plainfield. Jersey Silk Mills; Broad Silks; replaced their old equipment with new.

Summit. Summit Silk Co.; Broad Silks; building new dyeing department.

Union Hill. Clifton Textile Co.; Broad Silks; added new finishing plant.

West New York. Gerretson Silk Co.; Broad Silks; building addition and installing 44 new looms.

New York, Binghamton. Ballard Silk Co.; Commission Weaving; built addition 110 by 34 feet, 1 story and basement; installed 36 looms and warping and winding machinery.

Chadwick's. Standard Silk Company; Broad Silks; built new weaving mill with saw tooth roof.

Elmira. Stearns, J. N., & Co.; Broad Silks; made extensive changes to increase production and give greater efficiency in manufacturing.

Newburg. Palatine Silk Co.; Dress Silks; increased equipment to 40 looms.

Port Jervis. Katterman & Mitchell Co.; Broad Silks; built new 2-story mill, 250 by 50 feet; concrete with metal sashes; installed 700 spindles and 200 looms.

Sidney. Kayser, Julius & Co.; Silk Gloves; adding the manufacture of chamoisette gloves; also a cutting-up department.

Wayland. Huguet Silk Co.; Vellings, Chiffons, etc.; built addition 99 by 112 feet; installed 36 new looms, making capacity of the plant 128 looms.

Pennsylvania, Philadelphia. Concordia Silk Hosiery Co., Inc.; Fishers Lane and Wyoming Ave.; Ingrain Silk Hosiery; built 1-story frame addition, 40 by 60 feet.

Philadelphia. Oehrle Bros. & Co.; 425 North Third St.; Upholstery Trimmings, Tassels, Fringes, Cords, etc.; built new 4-story and concrete addition, 40 by 75 feet.

Philadelphia. Rionor Silk Co.; Narrow Ribbons; built new addition, 3-stories high, 64 by 138 feet; installed 14 new looms.

Philadelphia. Vigilant Mills; Leiper & Adams Sts.; Tapestry and Upholstery Goods; purchased three-story brick factory building, boiler house and storehouse at Margaret and Dittman Sts., Frankford; also Dale Mill on Gillingham St.

Allentown. Kaltenbach & Stephens; Narrow Ribbons; built new building, 92 by 350 feet; installed 200 new looms; erected new harness room 30 by 100 feet, and an extension to the stock room.

Berwick. Colonial Spinning Mill; Jouvard & Lavigne Co.; building new addition, 150 by 53 feet, of brick and concrete, for new warping department; also a new boiler house and storage building.

Catasauqua. Wahnetah Silk Co.; Broad Silks; added 30 new looms.

Chambersburg. Piedmont Silk Co.; Broad Silks; installed looms purchased from silk mill in Lackawanna, N. Y.; increased equipment to 224 looms.

Coatesville. Aronsohn, S. J., Inc.; Dress and Tie Silks; installed 60 new looms and additional machinery.

Columbia. Schwarzenbach, Huber Co.; Dress and Tie Silks and Ribbons; built new 125-foot steel fire tank.

Easton. Roehlin-Pittenger Silk Co.; installed 26 new looms.

East Stroudsburg. Fellows-Huber Co.; Dress Goods and Tie Silks; installed 24 new looms.

Elysburg. Perfect Silk Throwing Co.; Silk Throwing; installed new additional machinery.

Erie. Mallinson, H. R., & Co.; Dress Silks; built new 1-story addition, 142 by 101 feet, saw tooth roof.

Hazleton. Duplan Silk Co.; Piece Goods; built new 1-story power house; brick and concrete; built new weaving mill, 90 by 180 feet, with saw-tooth roof.

Hazleton. Hazleton Silk Mills; Louis Roessel & Co.; Broad Dress Silks; installed 17 new looms to replace old equipment; built new brick and concrete mill, 50 by 100 feet.

Hawley. Bellmont Silk Mills; Dexter Lambert & Co.; Throwing and Weaving; installed new copping department.

Johnstown. Buser Silk Co., Inc.; Silk Ribbons; added new looms and increased output.

Kingston. Crane Bros., Inc.; Silk Throwsters and Sewing Threads of all Kinds; built new boiler plant and machine shop, 26 by 65 feet; installed new power equipment.

Kutztown. Dery, D. G.; Dress and Lining Silks; built new 3-story brick mill, 50 by 60 feet; increased equipment to 234 looms.

Lebanon. Lebanon Silk Company; Fancy, Plain and Novelty Silks; installed new silk machinery; increased and overhauled plant.

Macungie. Macungie Silk Co.; Bindings and Ribbons; building new addition for use as a dyeing department.

Marcus Hook. American Viscose Co.; Artificial Silk; new 1-story brick building, 158 by 423; 2-story building, 44 by 73 feet.

Mt. Carmel. Mt. Carmel Silk Mfg. Co.; building new addition, 60 by 260 feet, and will install 50 looms.

New Holland. Storb, Snader & Co.; Broad Silks; installed 80 new looms; added steam power.

Reading. Lion Silk Mills; Broad Silks; installed 110 new looms.

Shamokin. Eagle, J. H., & C. K., Inc.; Taffetas and Linings; increased capital stock to $20,000,000.

Selinsgrove. Groce, Wm. F.; Commission Throwing; installed new power equipment.

Siegfried. Central Silk Mfg. Co.; Broad Silks; built new silk mill; installed new machinery.

South Bethlehem. Gallia Silk Mills; Piece Goods; installed 10 new silk spinners; doubled equipment of throwing machinery; installed 2,000 spindles; installed 26 narrow looms to replace wide looms taken out.

Stroudsburg. Monroe Silk Mills; Silk Ribbons; built new dyehouse, 21 by 42 feet; also storehouse, 15 by 40 feet.

Swarthmore. Victoria Plush Mills; Velvets and Plushes; building addition to plant at Lenni, Pa.

Walnutport. Walnutport Silk Co.; Silks; building new addition 17 by 51 feet.

West Pittsburg. Woodhouse, Bopp & Co.; Dress Silks; will enlarge plant.

Wilkesbarre. Wilkesbarre Silk Co.; Silk Throwing; built new 4-story addition, 80 by 48 feet; installing new machinery equipment.

Wyoming. Anthracite Silk Throwing Co.; incorporated with capital stock of $70,000; installed new machinery.

Rhode Island, Central Falls. Leader Weaving Co.; Silks and Silk and Cotton Fabrics, will erect a 2-story addition, 35 by 60 feet; will install new machinery.

Valley Falls. Reiling & Schoen, Inc.; Dress Silks, Wool Filling and Linings; built new building 2-stories high, in two sections, one is 106 by 40 feet, the other 94 by 91 feet, brick construction.

MISCELLANEOUS

Connecticut, Bridgeport. Henkels, Alb. & E.; Cotton and Linen Laces; built new 4-story mill, 50 by 220 feet; business incorporated with capital stock of $250,000.

New Haven. Forsyth Dyeing Company; built an addition one story high, 150 by 186 feet, to be used as a storehouse and grey room.

East Hampton. Summit Thread Co.; built new dyehouse; increased power department; added to water supply; rebuilt storehouse.

Kentucky, Louisville. Puritan Cordage Mills; Cotton Cordage; increased floor space in spinning room and finishing department; installed new equipment.

Illinois, Elgin. Western Thread Co.; Cotton Threads and Yarns; increased capital stock to $35,000; installed new equipment.

Massachusetts, Fall River. Algonquin Printing Co.; Indigo Blues, Greys, etc.; built 3-story addition, 250 by 100 feet; brick with gravel roof; installed 4 new printing machines for wide goods.

Lowell. Waterhead Mills; Dyeing and Finishing Corduroy; built new 4-story addition, 51 by 82 feet, for dyeing, bleaching and manufacturing purposes.

Lowell. Lowell Bleachery; Cotton Fabrics; installed 600 h. p. boiler with automatic stoker.

Lawrence. Plymouth Mills; Carpets, Rugs, etc.; built new 6-story addition; increased machinery equipment 50 per cent.

Fall River. American Printing Co.; Printed Calicoes; installing large filter plant.

Mansfield. Mansfield Bleachery; purchased large new reinforced concrete building for storage purposes.

Millbury. Windle, W. W., Co.; Scourers, Carbonizers and Dyers of Waste; built new addition, 216 by 56 feet; increased all departments.

New Bedford. Lambeth Rope Corp.; Rope, Braids, Cordage, etc.; installed new looms and additional machinery to weave spinning tapes; built addition.

North Adams. Arnold Print Works; Dyeing, Printing, Bleaching of Textiles; installed electric power equipment.

Peabody. Danvers Bleachery & Dye Works; overhauled plant; improved equipment.

Plymouth. Plymouth Cordage Co.; Rope, Cordage and Twine; increased capital stock to $4,000,000.

Minnesota, Duluth. Northwestern Textile Co.; Linen Towels and Crashes; installed ten new looms.

Michigan, Port Huron. Summers Linen Co.; Linen Rugs and Specialties; built new flax fiber plant to replace old building.

Yale. Livingston, James, Flax Co., Ltd.; Scutching and Hackling Flax; will rebuild burned plant.

Minnesota, Duluth. Northwestern Textile Co., Inc.; Linen Towels and Crashes; installing a quantity of new machinery.

St. Paul. St. Paul Twine Co.; Hard Fiber Binder Twines; Remodeling and enlarging plant and making changes representing an expenditure of about $200,000.

New Hampshire, Gossville. Barmer Narrow Fabric Co.; Edgings, etc.; building addition.

Meredith. Meredith Linen Mills; Crash Toweling; erected addition 60 feet long.

New Jersey, Camden. Peech Sons & Phillips Company; Winding, Coning and Mercerizing of Cotton Yarns; built a 3-story brick addition, 42 by 42 feet, giving 6,800 square feet of floor space; installed new winding and mercerizing machinery.

Fairview. Bellman Brook Bleachery Co.; Dyeing, Bleaching, Mercerizing Cotton Goods; built addition, 60 by 30 feet.

Jersey City. Davey, W. O., & Sons; Oakum; installed new machinery for reducing gunny bagging and working it up into jute threads for making plumbers' oakum.

Paterson. Lyons Piece Dye Works; Dyeing, Printing and Finishing Piece Goods; built addition, 50 by 114 feet; built an addition, 60 by 227 feet.

Paterson. Royal Piece Dyeing Co.; Redyeing and Finishing Yarn Dyed Silks; built new addition, 35 by 100 feet.

Rochelle Park. Rochelle Park Velvet Co.; Dyeing and Finishing Silks, Velvets, Plushes, etc.; built new dyehouse to replace old one destroyed by fire; increased facilities.

New York, Auburn. Columbian Rope Co.; Flax, Jute, Manilla and Sisal Rope and Twines; increased capital stock from $1,000,000 to $1,500,000.

Brooklyn. Davis & Quick; Dyers, Bleachers, and Finishers of Cotton and Silk Goods; installed new silk finishing machinery.

Brooklyn. National Filter Cloth & Weaving Co.; Cotton, Flax and Jute Filter Cloths; increased their equipment to 22 looms.

College Point. Weber, R. A., Silk Dyeing Company; Skein Silk Dyeing; increased capital to $70,000.

Garnerville. Garner Print Works; Calico Printing; built new community building, 2 stories and basement; 100 by 20 feet, for use of employes.

Pennsylvania, Philadelphia. Brehm & Stehle; Trenton Ave., below Allegheny Ave.; Yarns, Jute and Twine; built reinforced concrete, brick, stone and steel building, 44 by 52 feet, for the enlargement of dye and bleach plant.

Philadelphia. Bailey, John T. Company; Rope and Twine; new one story, brick and concrete new boiler house.

Philadelphia. Caledonian Dye Works, Inc.; Cotton Warps; building new three-story concrete building, 156 by 80 feet; enlarging present buildings, installing new additional machinery.

Philadelphia. Harvey Fibre Carpet Co.; will build 1-story addition of iron on iron frame construction, 16 by 40 feet and 75 by 30 feet.

Philadelphia. Horrocks & Bro.; Dyers, Bleachers, Finishers of Cotton Piece Goods and Warps and Yarns; building new one-story bleach house.

Philadelphia. Pennsylvania Silk Dye & Finishing Co.; Adams and Leiper Sts.; built new 1-story concrete addition, 10 by 14 feet.

Philadelphia. Peerless Company; Dyers of Skein Silk, Silk Hosiery and Bleaching Woolen Hosiery; increased bleaching department to double capacity.

Philadelphia. Phoenix Dye Works; Clearfield and Witte Sts.; added bleaching plant for hosiery.

Philadelphia. Restein, C., Co.; 137 North 2d St.; erecting new building, one story and basement, 60 by 225 feet, brick and stone construction, at Sepviva & Butler Sts.

Philadelphia. Summerdale Dyeing, Printing & Finishing Works; Printers and Finishers of Cotton Piece Goods; built additions and made alterations.

Allentown. Allentown Spinning Co.; Jute Carpet and Rug Yarns; building new warehouse to replace old one destroyed by fire.

Hazleton. Hazleton Bleach Works; Bleachers of Knit Goods in Piece and Cotton Yarns in Skeins; built new 2-story concrete and brick building, 50 by 100 feet; installed new power equipment, bleaching machinery and sprinkler system.

Reading. Liberty Dye Works; purchased property adjoining and will enlarge their dye plant.

Reading. Reading Dyeing Co.; Dyers of Cotton, Woolen and Worsted Yarns, Hosiery and Printing Hosiery, Bleaching Cotton and Worsted Yarns; new brick mill, 40 by 118 feet, to replace older and smaller structures.

Royersford. Snow White Bleachery; Bleach Underwear, Hosiery, Tapes, Yarns, etc.; installed four new kiers; installed new drying machinery.

Rhode Island, Pawtucket. Acme Finishing Co.; Bleaching, Mercerizing, Dyeing, Printing, Fine Cotton Fabrics; built new addition, 4-stories high, 160 by 27 feet, brick; also one-story addition, 60 by 27 feet, increasing capacity about 25 per cent.

Pawtucket. Dempsey Bleachery & Dye Works; Bleaching, Dyeing and Finishing Cotton Piece Goods; installed new power equipment.

Slatersville. Slatersville Finishing Co.; Bleachers and Dyers of Cotton Goods; overhauled plant; installed new machinery to increase capacity of the plant.

Tennessee, Chattanooga. Standard Processing Company; Mercerize and Bleach Cotton Yarns; built new 2-story addition, 60 by 176 feet; increased output to 35,000 pounds per week.

Canada, Ontario, Brantford. Brantford Cordage Co., Ltd.; Binder Twine; built addition to raw material warehouse, 60 by 60 feet; also addition to finished goods warehouse, 40 by 100 feet; installing new machinery.

Ontario, Cobourg. Cobourg Dyeing Co., Ltd.; Dyeing and Finishing Woolens, Worsteds, Broadcloths, etc.; built new addition, 50 by 60 feet, doubling capacity of dyehouse.

Ontario, Cobourg. Cobourg Matting & Carpet Co., Ltd.; Cocoa Matts and Matting, Jute Carpets, Jute and Flax Press Cloths; increased capital stock to $300,000.

Continuation Classes to Open

The classes of the Boston Continuation School will open this year on Jan. 5, and sessions will be held every Wednesday and Friday afternoons from four to six o'clock. The school will be, as in former years, at 48 Boylston Street, Boston, but this year will be under the direction of Frederick H. Bushy of the faculty of the Boston English High School. The enrollment of pupils is already as large as that of former years and a considerable number more are expected to attend when the classes open. The attendants are made up of clerks from the various retail dry goods stores, dry good commission houses, and from the cotton and wool houses of the city, and the curriculum this year will be confined wholly to the study of textile fibers and their manufacture. Lectures by men prominent in the textile industry have been arranged for and the pupils will be taken on inspection tours through mills to gain a first hand knowledge of manufacturing conditions.

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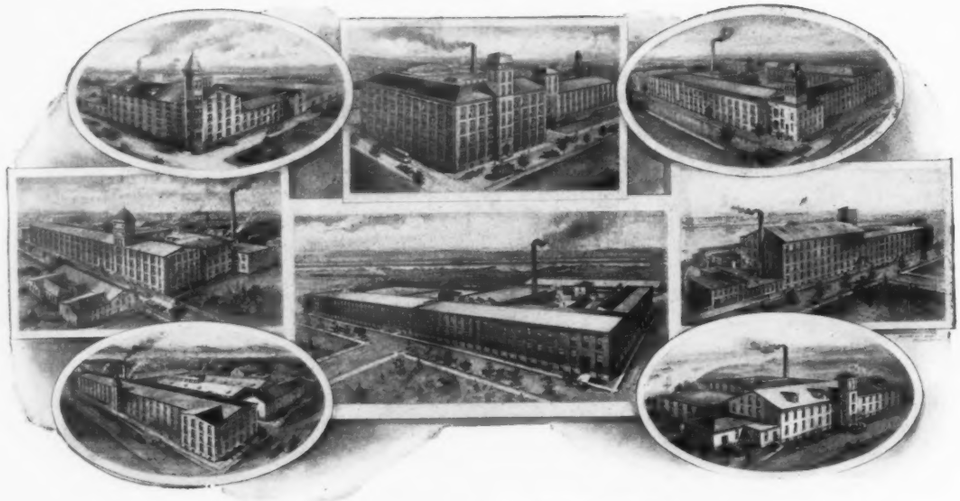

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